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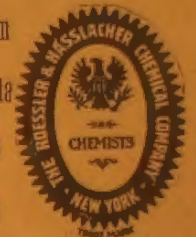
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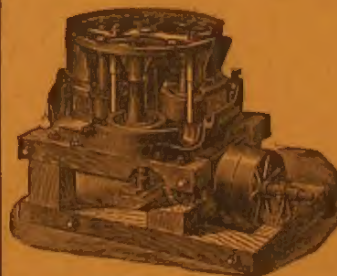
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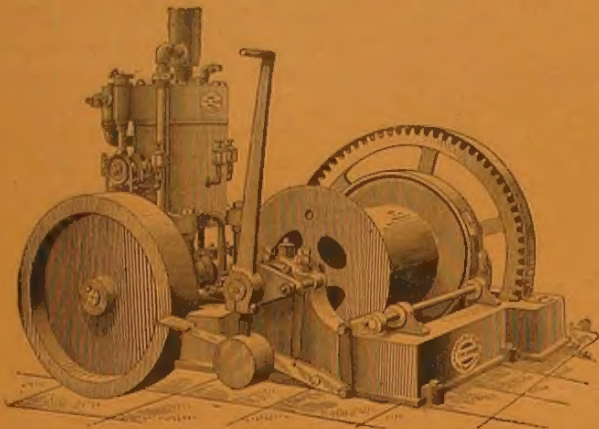
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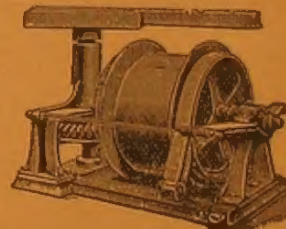
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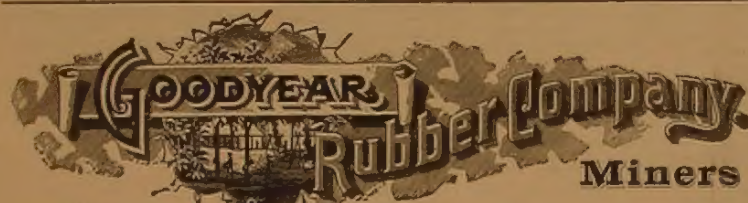
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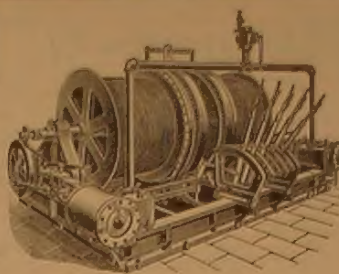


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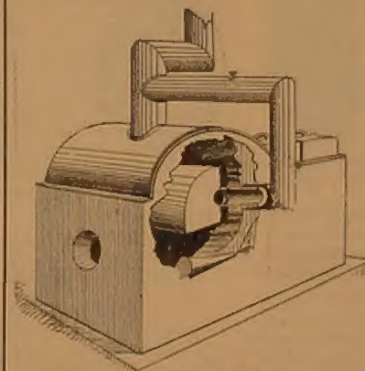
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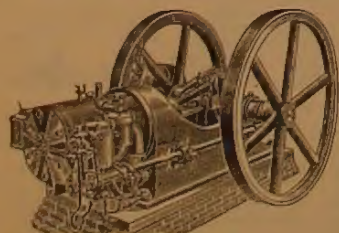
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ADVERTISING RATES FURNISHED ON APPLICATION.

**AID THE STATE MINING BUREAU.**

At the present time when the State Legislature is to be in session on the third proximo, is an opportune time to refer to the financial aid which the mining industry requires at the hands of our members.

Last year the printing appropriation was cut off, so that the work of the State Mining Bureau has not been published. The reports of the Bureau, as well as the special Bulletins on technical subjects, are of more than local or State interest, and have been in demand by outside parties, and cannot be obtained by even those who are resident taxpayers of this State. An economical policy on this subject is not the best means of advertising the mineral resources of this State, and of using means to attract capital to investment in our mines.

The Bureau has in course of construction a Register of mines and minerals of each county, to be accompanied by a county map. Each mine named in the Register will be marked with a corresponding number on the map.

These excellent county maps are a great aid to the prospector, miner and owner of mining property. It is therefore desirable that help should be given the State Mining Bureau in compiling such maps. These maps are not in all cases geological survey maps of the county where such county has not been reported on either by the Federal government Geological Survey staff or the State Mining Bureau officials, but consist of accurate topographical maps showing the location of mines, roads, trails, and for the southern counties, where springs are located. Such maps are a good means of advertising the mines and mineral resources of a district, as the mine owners will use them in attracting capital to their district. A liberal support in this respect is much needed for aiding the work of the Bureau, and in making it of greater benefit to the public generally. Advertising the State's resources is a wise expenditure in aid of increased information by means of the publications of the State Mining Bureau.

The custom of patenting placer mining ground is an injury to the mining interests of any section, whereas a lease from the government ought to be the manner of operating such claims. Placer ground is a knowable quantity, for work will determine its thickness, width and length. Its life of usefulness to the miner is only a question of time or extent, and when exhausted the mining rights ought to be vested in the government, so that any one else or the prior owner, in the event of the discovery of a ledge claim, could acquire and operate it as such. But that is

require and operate it as such. But that is not all the trouble inflicted by patenting placer ground, for the patent carries with it side and end line boundaries, which are vertical lines produced downwards or in depth, which restrict and prohibit the operation of deep mining on veins which may be and actually have been discovered on adjoining claims. Recent disputes as to title to the minerals under placer claims in several districts in Colorado, reported in the *Daily Mining Record* of Denver are evidence of the injustice done in patenting placer claims. This is evidence of the evil and undesirable consequences, which now attach to the wrong system of curtailing mining operations in depth, by confining the ledge miner, when the ledge dips at an angle from the vertical, within the confines of vertical lines for side line boundaries. It ought to satisfy the advocates of such a boundary that we have now got too much of it, and do not require any more to limit deep mining

## THE LEGAL RATE OF INTEREST.

The legal rate of interest in any State has an appreciable effect on the industries of that section, and when too high, or if there is no limit, has an especially retarding effect on the obtaining of capital for new mining investments. For that reason, local capital in California is not so easily obtained as eastern or foreign aid.

The recent act of the Legislature of Oregon in reducing the legal rate of interest from 8 per cent to 6 per cent, could with profit to the mining development of California be made the same. It would have the effect of stimulating investment in local mining enterprises and in manufacturing. Under the present conditions of high interest rates, the loaning of money at usurer's figures is more profitable to the investor, than embarking in legitimate trade enterprises. So long as extortionate rates of interest are the prevailing source of income to money lenders, private parties look for higher rate of interest, and have no inducement to invest in trade risks such as mining. The approaching session of the Legislature is a fitting occasion to adopt a much needed change in this direction.

### GOLD IMPORTATIONS.

The influx of gold into this country for the last year and a half has had an important influence upon the financial conditions. The importation of gold has not equalled the balance of trade in our favor. The difference has been expended in paying the expenses of our travelers abroad, in payment of interest upon our securities held in foreign countries, and possibly in the extinguishment of foreign indebtedness. However, there has been a material addition to our gold resources.

The question is, where has it come from? Nominally from Europe, and most largely

from London. In trade with Great Britain the balance is uniformly in our favor, but in the world's commerce the balance is almost never against Great Britain, and is nearly universally in her favor, and hence her shipments of gold to this country does not deplete her gold resources. She makes it up, and more too, from the other countries with which she deals.

By importations of gold to this country, none of the European nations suffer from depletion except possibly Germany. She has lately been compelled to procure gold in London. The gold imported in this country indirectly comes from countries against which there are balances in trade with Great Britain. France is astute enough to maintain her gold resources unimpaired.

There has also been an increase of gold production in this country, because its great value has stimulated extraordinary exertions. The expectation in regard to the Klondyke output has by no means been realized; on the contrary, there has been grievous disappointment. Unusual importations, and production from our mines have materially increased our stock of gold, and have had the effect to strengthen the position of the gold standard advocates.

As a set-off to this the extension of our domains to the inclusion of some of the Antilles and of the Philippines, has created a demand for a larger volume of money and the use of more silver coin. Already the people of Cuba and Porto Rico are getting rid of Spanish silver coins and substituting those of this country. The Filipinos are silver using people, as are the Asiatics generally.

Whether we import gold or not depends upon trade balances, and they fluctuate. Our exportations of breadstuffs for the last year and a half have been unusual, and perhaps phenomenal, caused by providential favors to us and disfavor to several of the cereal producing countries.

The present condition is not one upon which to predicate a financial system for all time. There ought not to be final action until experience with our new possessions shall have demonstrated what our needs will be. Our domestic trade is increasing from many causes, among them being the growth of our foreign commerce and the increase of our population. Our money volume must be adequate to our needs as they shall be developed. It will be unwise to enter upon a policy of restricted volume, which will result from the adoption of a narrow metallic basis. It is better to err on the side of liberality than in the other direction. Our energies must not be crippled by want of a sufficiency of the tools of industry and commerce. Money is an essential tool of both.

## LEASING MINERALS.

The custom of working minerals on leased land and the working of portions of a mine under a lease are a quite common and at times convenient manner of operating to both owner and miner. The leasing of land for minerals by a company when left to the discretion of a mine manager is not always a safe investment for the company. The owner of the land takes it for granted that the mine manager has the authority to make such a contract and whether he has received authority or not from the company his actions in the matter are binding on the company. If the lease is made for a period of years on the annual rental plan during its continuance the company becomes liable for the whole payments during the term of the lease. In the



event of the minerals becoming exhausted the company is liable for the rentals during the unexpired portion of the lease. On this account the tribute or royalty plan is the safest manner of leasing minerals. The lessee pays for just the amount of ore he mines and his interests are to mine as much as possible, but some land owners prefer the annual rental plan on account of their knowing before hand just what amount they are going to receive. Under the annual rental plan it becomes necessary to have the lease drawn up by a competent lawyer and the condition included in it that in the event of failure to find ore or should the business become unprofitable at any time, the lessee has the right to terminate the lease. Leasing on royalty at so much per ton for all ore mined or sold is however the most common and satisfactory manner of operating under a lease and in the interest of the largest amount of output and profit to both parties, if a provision is included in the lease for conducting the mining operations in a safe manner for future operation of the property.

### CLOSED ITS DOORS.

One of Colorado's most worthy institutions has closed its doors. The Miners National Bureau of Information, which has done so much in the advancement of the Colorado mining industry is no more. The objects of the bureau were to advance the general prosperity of the miners and mining industries, whether gold, silver, copper, lead, iron, stone, marble, coal or any other material, as well as mineral oil and kindred interests; the investigation of all new methods of reduction and treatment of ores; to procure, preserve and disseminate information in relation thereto; to give assistance to the miner, the prospector, and the investor, by bringing them together and establishing a miners' market, etc., but its labors are at an end. The mining men of Colorado did not appreciate the faithfulness of its work; the assistance or advantages it gave, or the facilities it afforded, so through lack of support from the very people the bureau was formed to help, it has succumbed. We trust that it will be reorganized in the near future, and receive the support it is entitled to.

### STEAM BOILER HEATING SURFACE.\*

(BY CHARLES WHITING BAKER.)

It is a fact which is now generally understood by engineers, and all who have to do with steam power plants, that the power of any boiler, or more accurately the amount of steam which it can furnish in a given time, depends first of all upon its area of heating surface.

Of course the amount of steam which a square foot of heating surface will produce varies between very wide limits, and is affected by a multitude of conditions. It is also that heating surface is no more essential than the means for supplying heat—that is to say, a surface of sufficient size and grate surface to burn the fuel, and draft sufficient to supply the furnace with the necessary air.

The furnace and the chimney, however, are not necessarily parts of the boiler at all; their function is merely to supply the heat, and the function of the boiler proper is to transfer as much as possible of this heat to the water which it contains. Both the amount of heat

which it can transfer in a given time and the proportion of the total heat generated which can be transferred vary with the area of the heating surface exposed. In other words, both the capacity and the economy of a steam boiler depend directly upon its area of heating surface.

Evidently, then, the area of the heating surface of a boiler ought to be determined with a fair degree of accuracy. The designer of the boiler must know it, if, with any degree of precision, he is to adapt the boiler to the work which it has to do. The seller of boilers must know it, if he is to be sure of fulfilling his guarantees of capacity or economy; and the purchaser of boilers should know it, in order to determine what he is getting for his money.

As a matter of fact, a very large proportion of the boilers bought and sold are actually bought and sold by their heating surface. The prices asked for and quoted may be the price per horse power, but the horse-power is determined directly from the heating surface, the number of square feet allowed to a horse-power varying from 5 to 14, according to the type of the boiler. Again, in comparing the work done by the different boilers, the relative heating surface is always taken into consideration.

We need not go further for proof that accurate determination of boiler heating surface is a desirable thing. But we have now to notice the remarkable fact that in computing boiler heating surface, an error of from 7 to 17 per cent is made by a large proportion of steam engineers and boiler manufacturers.

The error to which we refer consists in taking the surface in contact with the water, instead of that exposed to the fire or hot gases, as the heating surface. If the heating surface is flat, of course the areas are the same; but boiler heating surface is in most cases made up of tubes, and the difference between the interior and exterior surface of a boiler tube is as much as 17 per cent of the interior surface in the case of a 1-inch tube and is about 7 per cent in a 4-inch tube.

The error arises in the first place from a failure to appreciate the fact that the heating surface exposed to the fire is the actual heating surface of the boiler, on which its capacity depends. A clear understanding of this fact is so important, and it has been and is so generally mistaken by engineers and writers of engineering works, that the writer ventures to submit a discussion of the elementary principles on which this assertion is based.

Suppose we have an iron plate one inch thick on the one side of which is flowing a current of hot gas at a temperature of, let us say, 1,000 degrees, and on the other side is a body of water in a steam boiler at a temperature of 300 degrees (corresponding to a gauge pressure of steam of about 52 pounds).

Now the heat in passing from the hot gas on the side of the plate to the water on the other meets with three different resistances as follows:

(1) Resistance in passing from the gas to the surface of the plate.

(2) Resistance due to the passage through the plate

(3) Resistance due to the passage from the other surface of the plate to the water.

That the one of these resistances which is accurately known is (2), the resistance in the passage through the plate. The heat conductivity of metals has been carefully determined by experiment in physical laboratories, so that if we know the actual temperatures of two surfaces of a plate and its thick-

ness, we can at once determine how much heat is passing through a unit area in a given time. On the other hand, if we know how much heat is passing through the plate, we can determine what is the difference of temperature of its two surfaces. Let us solve an example of the latter sort:

Suppose the plate is transmitting heat enough to evaporate 3 pounds of water per hour from and at 212 degrees per square foot of its area, or about the average rate that the heating surface transmits heat in an ordinary stationary boiler. Since 965.7 heat units are required to transform a pound of water at 212 degrees into steam at the same temperature, the plate will transmit  $3 \times 965.7 = 2897.1$  heat units per square foot per hour, or for convenience let us say 2,900 heat units.

Now experiments on the conductivity of metals have shown that an iron plate, 1 foot square and 1 inch thick, whose opposite surfaces are kept at a uniform difference in temperature of 1 degree Fahr. will transmit in an hour 473 British thermal units.\*

Hence, to transmit 2,000 British thermal units per hour, the difference in the temperature of the two sides of the plate will be  $2,000 \div 473 = 6.13$  degrees.

I doubt not it will surprise many to learn that so small a difference of temperature between the two surfaces of an iron plate is sufficient to cause so large an amount of heat to flow through it; but the coefficient for the heat conductivity of iron on which it is based is the result of many experiments by the most eminent physicists, and is accepted as correct by the best scientific authorities, and there is no reason to doubt its accuracy.

Many engineering text-books and pocket-books still quote Rankine's formula and Peclet's coefficients for heat conductivity; but the latter have been found by the more careful research of modern physicists to have been largely in error.

In studying our present problem, however, the exact accuracy of the coefficient is a matter of no particular importance. We just found that boiler-heating surface 1 inch thick, when transmitting 2,900 heat units per hour, will have a difference of temperature on its two sides of 6.13 degrees Fahr. But we never have heating surface of such thickness in steam boilers. The shell heating surface in internally fired boilers is seldom over  $\frac{3}{8}$ -inch thick. Furnaces and fire boxes are made of  $\frac{1}{4}$ -inch to  $\frac{3}{8}$ -inch plates, while tube-heating surface is from 1-16 to  $\frac{3}{8}$ -inch thick.

We see then that the actual difference of temperature between the two surfaces of a boiler tube, transmitting heat at the rate already named, will be from an  $\frac{1}{8}$  to 1-16 of 6.13 degrees, or in round numbers from  $\frac{3}{8}$  degree to less than 1 degree Fahr.

As the eminent physicist, Lord Kelvin, has said, for all practical purposes we may consider that the heating surfaces of steam boilers conduct heat as if they were no thicker than paper, or as if the metal were of infinite conductivity.

It will be seen also that an error of 50 per cent, or even of several hundred per cent, in determining the coefficient of conductivity of iron, even if such an error were probable, would make no practical difference in this conductivity of iron, even if such an error were probable, would make no practical difference in this conclusion.

There are many facts of practical importance to be drawn from this. For example, in its light we can readily see how little reason there is to expect any greater economy

\* Paper presented at the Niagara Falls meeting (June, 1898), of the American Society of Mechanical Engineers.

\*Ganot's "Physics," 13th ed., page 338.



in locomotive boilers with brass or copper tubes and fire-boxes than in those of steel. Yet we still hear the superior conductivity of copper urged as a reason why English railways stick to the use of copper fire-boxes.

We know now that the two surfaces of the plate previously referred to (if we conceive its thickness reduced to that of an ordinary boiler tube), will have only a trifling difference of temperature. Next let us discuss the relative heat-absorbing powers of the water on the one side of the plate and the hot gases on the other. It is to be kept clearly in mind that the temperatures of the two sides of the plate which we have just considered are the temperatures of the skin of the plate itself, which is quite a different matter from the temperature of the air or the water in contact with the plate.

If this is clearly understood, it will be easy to understand that the actual temperature of the plate itself depends on the heat-transmitting power of the fluids on its two sides. If these fluids were the same on the two sides, and were at the same temperature and under the same conditions as respects mobility, then the plate temperature would be in a mean of the temperatures of the fluids on its two sides. But since water is many times as efficient as air or furnace gases in absorbing heat, the plate temperature will be nearly the same as that of the water and far below the temperature of the hot gases.

This is a fact which is a matter of common knowledge, and yet it has been overlooked by many engineers and by engineering writers; and because it has been overlooked is one main reason why engineers have not always insisted on the fire side of tubes being considered the heating surface of steam boilers.

Let us review some of the facts which show the relative heat-absorbing power of the water and gases. Take an iron rod and heat it to redness, and then let it be held still with only the air in contact with it, and see how long a time elapses before it is cool enough to be touched. Heat the rod to redness again and then plunge it in water, and again note the time before it can be touched. We have then a very rough approximation of the relative heat-absorbing power of air and water.

Again, experiments have been conducted to determine the temperature to which a metal plate could be heated when one side was in contact with water. The temperature was determined by inserting in it plugs of various fusible alloys, and the fire side of the plate was then subjected to the most intense heat that a powerful blow-pipe could produce. So long as the water side of the plate was clean, it was impossible to melt the fusible plugs. It may be well to point out that this method of determining the maximum temperature reached by the plate is subject to more or less error, on account of the obstruction to the passage of heat from the plug to the metal of the plate (the plug being merely embedded in the surface of the plate and not passing entirely through it). Any joint between two metal surfaces interferes with heat conductivity, just as it does with electrical conductivity. The amount of interference depends upon how intimate the contact is between the metals, the amount of oxides (if any) between them, etc.

The most striking illustration, however, which the writer has ever seen of the large heat absorbing power of water, as compared with air, was an experiment conducted by him, for another purpose, some years ago. A vessel having a single vertical tube, of about 2 inches diameter, was filled with cold water

(45 degrees to 50 degrees Fahr.); the hot gases from a large oil lamp or a Bunsen burner, at a temperature of some 1000 degrees or more were then passed up through the tube. The surface of the tube exposed to the hot gases was kept so cold by water on the other side that drops of dew were condensed upon it from the hot gases, and the interior of the tube became actually coated with dew, which remained until the water was warmed to about 60 degrees. I advise any one who may not be convinced as to the enormous heat-absorbing power of water as compared with gases to try this simple experiment.

(To be Continued.)

### Concerning Lead Peroxide.

LOS ANGELES, Cal., Nov. 8, 1868.

EDITOR JOURNAL.—Having occasion to use some peroxide of lead, and not knowing how it is manufactured, I ask your aid in the matter. Can it be made in sheets and cut or shaped as desired? If so, what is the method? If it is sold in sheets, where can it be had? Are battery cells manufactured in this State or west of the Mississippi?

ENQUIRER.

Peroxide of lead ( $PbO_2$ ), also called brown oxide or binoxide of lead, is a compound formed by the combination of an atom of lead ( $Pb$ ) and two atoms of oxygen ( $O$ ). It is a dark reddish brown amorphous powder, insoluble in water, and has a specific gravity of 8.902—9.190.

It is prepared by dissolving the protoxide of lead ( $PbO$ ) out of red lead ( $Pb_3O_4$ ) with dilute nitric acid. There is formed thereby lead nitrate,  $Pb(NO_3)_2$ , which goes into solution and there remains the insoluble powder of lead peroxide above mentioned.

It cannot be rolled into sheets, neither can it be melted into a bar, as heat would decompose it, leaving litharge or protoxide of lead.

We do not know of any process for making sheets of peroxide of lead. We are unable to ascertain where sheets of peroxide can be obtained; probably some of our readers can supply the desired information.

The battery cells referred to by our correspondent evidently are storage batteries, and in these various preparations of lead are used, peroxide of lead among others. Each manufacturer varies this and keeps the matter of composition and formula of this lead paste a trade secret.

In reply to the last inquiry we can state that we do not know of any extensive battery manufacturing plant west of the Mississippi river. The largest manufacturers are the Chloride Accumulator Company, located in Philadelphia.

Extensive improvements is the order of the day at the establishment of B. M. Calkins Co., the assaying firm located at 127 West First street, Los Angeles. They are re-arranging, refurbishing and handsomely equipping their compartments so as to be able to speedily and accurately turn out the increased amount of assaying, chemical and analytical work coming in. Their office and reception rooms will be enameled in white and gold, presenting a pleasing appearance to the eye of one entering.

The Jackson Drill and Manufacturing Co., of Denver, are making an effort to introduce their Hand Power Rock Drills in California and the Pacific Coast generally. They have already succeeded in placing a goodly number, and bid fair to make a good business from the coast trade.

A very neat pamphlet is issued by the Crescent Steel Co., of Pittsburg, Pa. It is a work of art, and is entitled *Steel Making*, and gives a short historical synopsis of the advancement made in the manufacture of steel, while the principal feature of the pamphlet is a description of the Crescent Steel Company's Works. The plant comprises 15 main departments, bristling with their hundred or more stacks. These consist of the Melting department, 10 Rolling mills or trains, the Iron Finery, the Forge and Hammer department, a Rod and Wire Factory and a Spring Shop. In addition to these are Annealing Furnaces, Iron and Steel Warehouses, the Motive Power department, the Electric Lighting and Power department, and others.

James Irving & Co., the gold refiners and assayers, have secured quarters formerly occupied by the firm of Smith & Irving at 128 North Main street, Los Angeles, Calif. When thoroughly arranged, according to the plans and intentions of the firm, this establishment will be one of the largest and most complete plants for the testing and assaying of ore in Southern California.

We are in receipt of S. D. Kimbark's catalogue of blacksmith, mining and wagon supplies. The house is in Chicago and one of the most complete of any in the United States. Aside from the neat and convenient form of this catalogue, and the splendid half-tone likeness of Mr. Kimbark as the frontispiece, the book is very comprehensive, bound in cloth, and a poetic novelty to the trade. Mr. Kimbark has such good faith in the future of the great West that he has selected the MINING AND METALLURGICAL JOURNAL as the only publication in the United States to advertise his wares in. We appreciate his good judgment and bespeak a prosperous year for the house of which he is head.

The first section of the Register of Mines and Minerals, to which the State Mining Bureau is devoting most of its energy, was displayed in proof at the annual convention of the California Miners' Association held in San Francisco, Cal., on the 21st, 22nd and 23rd of November, and its publication will soon follow. This is the one dealing with Nevada county, and State Mineralogist A. S. Cooper hastened it for the occasion, having printed and prepared it at his own expense. Its dozen or so of pages are wide and give in tabulated form a variety of information about 300 or so mining properties of all sorts in that county, including about sixty mills. A map 30 inches long by about 24 inches wide will accompany the register, and it will show the topography, roads and trails, developed mines with reference numbers, water and electric power plants, etc. It is in three colors. This first register is issued through a special arrangement, the State Printer being unable to handle such work by lack of funds. Twenty other county registers are completed in manuscript so far, and will be published when the State Printing Office can do the work. Each one is revised by a deputy appointed in each county and familiar with the mining field. Charles Uren has revised the work for Nevada county after compilation from existing information at the bureau. The value of the work is rather lessened by the remarkable unwillingness of mine-owners to give information about their properties. In Tuolumne county but seven responded, and hence the information given is largely that gathered from general report and the judgment of the deputy.



### JEFFERY ELECTRIC LOCOMOTIVE FOR IRON WORKS.

The demand for an electric locomotive for use about iron works and steel mills lead to the designing of such a machine by the Jeffery Manufacturing Co., Columbus, Ohio.

This type locomotive was designed to meet the demand and was based upon the experience the manufacturers have had in the construction of such machinery. That it has proved a success is demonstrated by the number installed since placing on the market. It was designed with a special view of making it easily handled, compact, strong and having all parts easily accessible.

The frame consists of two solid gray iron castings, securely bolted together with turned bolts in reamed holes. This frame can be mounted either inside or outside of wheels, according to gauge of track on which the locomotive is to operate and rests upon four spiral springs supported by journal boxes of the standard railway type. There are four wheels and two axles, the wheels are of the open plate chilled type and are keyed as well as forced onto the axles.

The axles are of hammered steel accurately ground and turned down.

There is but one motor mounted in such a manner that it receives no injurious vibration when locomotive is in operation. The motor is of the multipolar type, series wound, with iron clad armature and designed especially for this class of work. The armature and field coils are completely encased in the cast iron field frame and are thoroughly protected from injury.

The entire internal mechanism of the locomotive is fully protected by a covering which is hinged on the frame in such a manner that it can be raised and the motor reached with ease. The locomotive is provided with gong and head light.

The controller is located on one end of the locomotive in such a position that the controller wheel, brake wheel and sand box lever are convenient to reach without delay when necessary.

The sand boxes are located so that the sand

is delivered in front of the driver when running in either direction.

The trolley is so designed that it can be reversed by the operator without leaving the seat.

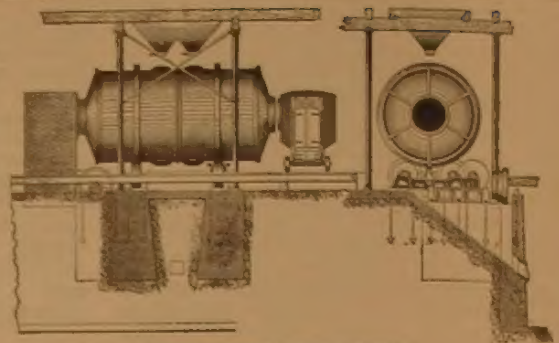
The illustration given herewith shows the locomotive complete ready to operate. The locomotive is well fitted for the work which it was designed to perform and as an up-to-date piece of machinery is only another evidence of the reputation of the manufacturers.

The demand for electric locomotives makes this invention very valuable.

### ROASTING FURNACES.

The natural tendency of news gathering in engineering as in other matters is to give prominence to claims of novelty. Of even greater value however and not so often presented are the records of long and successful service. Ten years ago one hundred and fifty six (156) large Bruckner Roasting Furnaces were furnished by Fraser & Chalmers, 133 Fulton St., Chicago, Ill., for the Anaconda Copper Mining Co. These are still in active and successful service. When we consider the size of these furnaces 8 ft. 6 in. diameter by 18 ft. 6 in. long inside dimensions, and the space required by so many of them, it is a commentary on the magnitude of the Anaconda works which calls for no additional remark. Since that time many of these furnaces have been supplied to large metallurgical work. These are in some cases of larger size, but of similar design to the illustration which shows the brick lined fire box mounted on wheels, and gives a clear idea of the method of driving, discharge chutes and other details. This style is used on ores, but for the heavier concentrates the cylinder is driven by a pinion meshing with a large spur gear encircling the furnace. The fire boxes are sometimes built stationary. The revolving furnaces are lined partly with fire brick and with common brick. The time of roast and speed of rotation are easily varied to suit the ore.

These furnaces have been built with special modifications such as arrangements for continuous feeding and discharge, and blast piping for oxidizing the roast. Roasting however usually requires to be done gently. The process cannot be forced without going too far; either smothering the ore or wasting values. For ordinary purposes the ore is sufficiently stirred and oxidized by the rotation of the barrel, and the satisfactory service of the regiments of these roasting furnaces at the Anaconda works would seem to leave little to be desired.



BRUCKNER ROASTING FURNACE.

### Railroad Commission's Investigation.

What some people were so bold as to predict almost three months ago, has come to pass. The railroad commission's investigation into the alleged extortionate ore freights has been dismissed, or at least such disposition of the case has been sought by the petitioners. The following request was filed in St. Paul.

Duluth, Minn., Nov. 25, 1898.—To the Honorable the State Board of Railroad Commissioners, St. Paul, Minn: Gentlemen—In view of the very protracted and expensive character of the proceeding for a reduction of rail rates on iron ore, and the apparent indifference of land owners generally, who are equally interested with ourselves in the result, we have concluded that we will not continue to bear, substantially alone, the accumulating burden of expense, and herewith enclose a certificate of the dismissal in that matter.

J. G. BROWN, WM. J. CONAN, ELIZA CONAN.

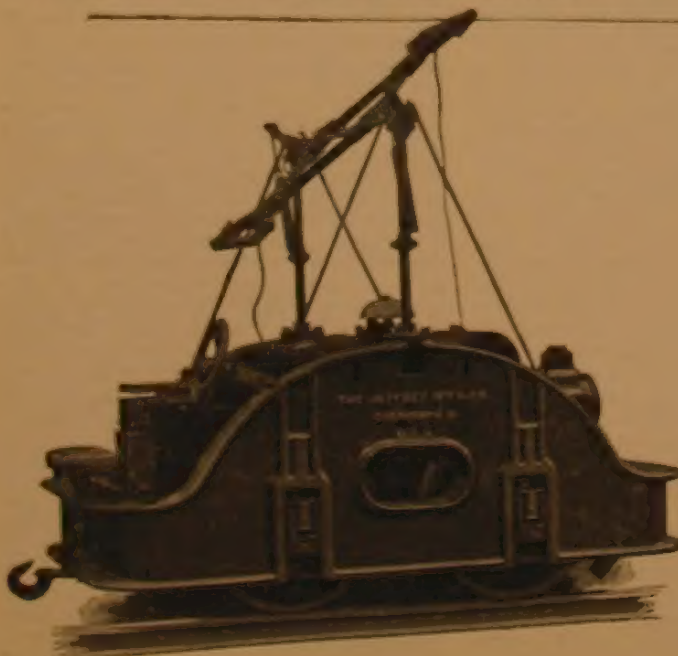
The investigation, it will be remembered, was begun on the petition of these owners of mining properties, who, however, it was admitted, represented also other parties so interested. The two railroads appearing as respondents—the Iron Range and Misabe—at once made preparations to contest the charge.

J. G. Brown says in explanation of the continuance that he was informed that he was left to fight the case alone by furnishing the considerable money required to do so or to join in requesting a dismissal, the latter of which courses he finally concluded to take.—*Duluth Tribune*.

### The Greatest Mines in the World.

More gold-bearing rock is being crushed on Douglas Island, Alaska, than in an equal area of any other country in the world.

The Treadwell and allied companies now have 880 stamps set up—540 on the Treadwell, 120 on the Mexican, 100 on the Union, and 120 on the Ready Bullion—and the engineers will soon turn over the mills to the companies as completed. These mills will easily crush 2000 tons of ore a day. It is not believed there is any place in the world, South Africa, Australia, or anywhere else, where so much rock is being crushed on so small a space of ground. The Treadwell now has 8,000,000 tons of ore in sight. The Ready Bullion promises to equal the Treadwell in the amount of its production. All the dirt has been sluiced off and it has been traced for 300 feet along the beach and 600 to 700 feet along the hill. It is from 30 to 100 feet wide on the surface, and is in the contact between greenstone and slate, as are all the Douglass Island ledges, the ore being of the same character as the Treadwell. The shaft is down 650 feet under Gastineau channel and the ledge has there widened out to over 200 feet and carries from \$12 to \$14 in gold throughout.—*Arlington (Ore.) Record*.



JEFFERY ELECTRIC LOCOMOTIVE



## JEFFERSON COUNTY MINES.

The mining town of Basin, Montana, is situated in Jefferson county, about thirty miles southwest of Helena, the capital of the state, and about twenty miles northeast of Butte, the world-famous smelter town. It lies in a great mineral belt, but has not received the attention it deserves. There can be no accounting for the neglect of this section or, for that matter, the whole of Jefferson county, other than that the country was thought to have been prospected years ago, and while mineral was known to exist it was not thought to be in sufficient and paying quantities to warrant working. This, to a certain extent, is true, for the ores of this district, wherever opened to sufficient depth, invariably prove them to be concentrating and generally what is known to be low grade; nevertheless, when opened up are in abundance, but at the same time necessitating the expenditure of a large sum of money in erecting concentrating machinery, something that the majority of claim holders fail to possess. Another feature of the mineral deposits of Basin and the Cataract—they lie in great depth. This is almost invariably true and the few exceptions are really noticeable, as their number can be readily distinguished. Nearly all the prospecting done has been in the form of tunnels, and in many places these are extensive. To mine in this sections, deep shafts must be sunk tapping the pay ore at a depth of from 200 to 500 feet.

The most notable instance proving this assertion may now be seen in the famous Hope mine. For years, off and on, prospectors had worked on this claim, always in ore, but too low to ship and pay smelter charges and until the present owners took hold and sunk the shaft to the 200 foot level the property was not considered of much value. Every foot that is sunk additional proves the property to be of greater value.

The Hope is among the most prominent mines now in operation; it is owned by the Basin Mining Co. The officers and directors are composed of R. B. Smith, president; C. A. Whipple, secretary; A. E. Spriggs, treasurer, and M. L. Hewett, general manager. E. C. Gilbert is the superintendent and employs nearly fifty men. The lead runs almost due east and west and varies in width where worked from 16 to 30 feet. Many rich shoots of ore have been encountered. Considerable development work has been carried on and

and more than 20,000 tons of ore has been staped out.

The mill was originally built for a capacity of 100 tons of ore per day, but it has at times been crowded to reduce 150 tons of ore per day. The ore is a first class concentrating proposition and readily reduces from six to ten tons into one, making a concentrate valued at from \$50 to several hundred dollars.

The Katie, the adjoining claim, is an extension of the same lead as the Hope and is owned by Massachusetts capitalists. Previous to the fatal fire which occurred August 13, 1895, the property was equipped with the finest concentrating plant in the west, and a hoisting plant suitable to develop and work the property to a depth of at least 500 feet. The shaft on the property is a double compartment and perpendicular.

The company rebuilt the milling plant on a much larger scale, and it has a capacity of handling 500 tons of crude ore per day. A smelter is also in the course of erection to treat the concentrates from this property as well as ores from other mines in the Basin and Cataract districts.

Between Basin and Helena, about midway, the towns of Wick's and Corbin are located, on a branch road of the Northern Pacific Ry. These camps are also within an extensive mineral zone and a number of good properties can be seen scattered here and there.

The Alta mine has been in constant operation for nearly twenty years past and may be considered the peer of any in the country in the production of the precious metals. The mine is located northeasterly from the town of Wickes, a distance of two and one-half miles. The lead varies in width from forty to sixty feet. It has for years been worked by tunnel to a depth of 800 feet. In this tunnel there is a station, 1,200 feet from the mouth, in which is located an electric hoisting plant and a three compartment shaft from which levels have been run. The ore is taken from these and hauled through the tunnel to the surface by mules, where it is dumped into the ore bins and then hauled by cars to the concentrators at Corbin.



KATIE CONCENTRATOR DESTROYED BY FIRE, AUGUST 13TH, 1895

about \$12.00 per ton of all metals contained in the ore.

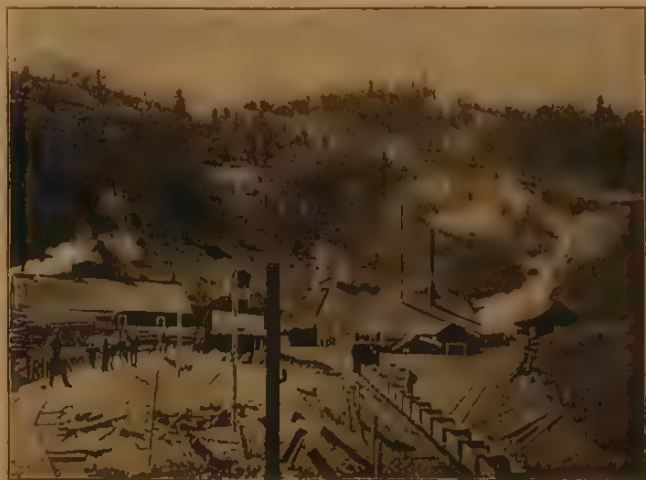
The ores are run to Corbin, three miles, on a narrow gauge railroad, the property of this corporation, over which they haul 350 tons per day to the concentrator. From Corbin the concentrates are shipped to East Helena to the company's smelting plant. About 180 men are unemployed in and about the mine and mill.

The high grade silver producing district of Lump Gulch is located between Corbin and Helena, embracing a tract estimated at about eight miles long by about four miles across, containing Lump, Clancy, Strawberry, Shingle and Warm Shingles gulches, being about twelve miles south of Helena. The country rock of the silver belt is a coarse grained micaceous granite, in which the ore producing veins are fissures, having a strike across the granite formation nearly east and west.

To the Hon. Thomas G. Merrill belongs the credit of first demonstrating to the world that the mineral bearing ledges of Lump had their smaller ends up and that a moderate amount of development was required to uncover some of the richest silver ores ever mined. Mr. Merrill was present in the gulch at the first stampede into the district; soon after, in 1866, he located a quartz claim on ground now included in the Liverpool property, but afterwards he abandoned it. Returning to the gulch in the early 80's he again located the ground, calling it the Liverpool, and began prospecting it with a view of further development. On account of shortage in his funds this development was delayed until about five years ago, when Mr. Merrill associated John S. Miller of Helena with himself in the property. Only a few weeks of active work and the expenditure of \$1,000, sufficed to disclose large bodies of ore running hundreds of ounces of silver to the ton, and to put the Liverpool on a dividend paying basis, where it has since remained. Within eighteen months thereafter the two fortunate owners divided up the immense sum of \$200,000 profits between them.

The mine is located on the north side of Lump gulch, near its mouth, about three-fourths of a mile from Hartford station. The richest ore and largest body of it is found in the 400 foot level, where ore running 800 to 1200 ounces silver per ton are frequently encountered, besides a large pay streak having a value of about 200 ounces per ton.

Among the other mines of the district are



THE ALTA MINE AT ALTA.

The mine is located on what is called Alta mountain, which rises high above any of those surrounding. The formation of the country rock is a porphyry and granite and the vein is a true fissure contact. The minerals contained are gold, lead, silver and copper, averaging





ALTA CONCENTRATOR AT CORBIN.

the Washington, Little Nell, Free Coinage, Little Alma, Old Dan Tucker, King Solomon, New Stake, the well known Legel Tender, the Harvey, Rose, Wickes, Norma, Hope, Baby, Helen, Tycoon, Haldemac; the Thursday, Lone Star, Horseshoe, Oxshoe, Little Katie and the Mipsic.

Ledge mining in the vicinity of Whitehall in the southern portion of Jefferson county has been carried on with one exception in a desultory way only about three and one-half years. In times past considerable placer mining was done in the Pipestone district and quite successfully too; and at present in a small way on the Little Pipestone. Southwest of Whitehall there are numerous silver properties that were valuable when, "silver was silver", and mostly patented properties, that will again be valuable some day. In the same district there are a number of fine copper prospects which have also laid dormant for years, but the present flurry in the copper market having stimulated the pursuit of copper mining these claims are again attracting the attention of mining men of note. There are also a few good gold prospects in the same locality notably among which is the Golden Valley. North of this is the Columbia another producer. There can be little question about the country on every side of Whitehall being rich in mineral resources of almost every description. To the northwest are good lead mines which in better times yielded good values. In the immediate vicinity of the lead mines are silver and gold prospects which already give strong evidence of proving good mines with development, the ores being very similar to the Golden Sunlight group five miles easterly from Whitehall; that is the gangue or vein filling is quartz, rarely spar, at places porphyritic matter, clay and crushed and brecciated slate, all of which are generally cemented or heavily impregnated with iron pyrites and quartz.

Adjoining the Sunlight properties is a group of copper properties known as the Honaker group which show immense deposits of the red metal.

About five miles still eastward are the North Boulder properties, the vein running back from Jefferson Island, a distance of nearly two miles. The Whitmore-Brooks properties yield as high as 40 per cent. copper and a little gold and silver.

The building of the Parrott smelter near this place was the principal stimulating agent for development of prospects of all kinds, es-

pecially gold and copper, and in the last two or three years the vicinity of Whitehall has become one of the great gold and copper producing districts of the great state of Montana.

With the advancements made in treating low grade ores this section has taken an enormous stride forward. It is gratifying to witness the results in the milling of Jefferson county ores, which has been accomplished in the last few years; and prospects are bright for greatly increased outputs in the future.

The series of illustrations presented herewith are fair representations of the mining operations carried on at the present time.

#### GENERAL MINING NOTES.

The car of machinery for the Young America which is expected in Bossburg, Wash., includes a large boiler and engine, compressor, machine drills, electric light plant, etc. Everything at the mine is awaiting the arrival of the car. The buildings and flume are about completed.

The Northern Light Gold Mining and Milling Company will make a shipment shortly of ore from the new strike in some of its properties on Lion Hill in the Ophir district portion of the Mercur region, five miles northwesterly from Mercur, Utah, and is expected to be something phenomenal as to value.

It is reported that the Sunshine properties at Sunshine, Utah, will bustle with activity in the near future, as the company proposes to resume operations.

The showing at the Valeo mine, at Park City, Utah, is all that could be desired. Thomas Kearns, the manager of the great Silver King mine, has been elected president and manager of the Valeo, and this is a guarantee that the property will be operated on a strictly businesslike basis.

#### The War Eagle.

On the War Eagle mine near the town of Rosslaud, B. C., the last raise in the big ore shoot between the 500 and 375 foot levels has been completed, as has also the raise to the west of the shaft in the ore body between the 375 and 250 foot levels.

The east raise opens the great ore shoot which was met some months ago. At the 275 foot level the shoot shows 10 feet of \$32 ore, while at the 500 foot level the same shoot is 32 feet wide, of which 12 ft. is \$35 ore, while the

rest is valued at \$10. The electrical machinery for the new gallow's frame is being rapidly installed and the huge masonry foundations for the apparatus are nearly complete.

The Le Roi shipped 15,445 tons of ore during the month of October, and the cost of extraction, including the dead work, advanced development and hoisting of waste, was only \$2.47½ per ton.

A ten-years' lease has been completed of the nine-sixteenths interest of the Kleinschmidt Bros., of Helena, Montana, in the Peacock, Helena and White Monument mines Seven Devils country, Idaho. J. Glass is general manager of the company. They will prosecute development work, if necessary, until spring, when the tramway to carry the ore to the river will be built. The ore bins will be on the Snake river, which runs three miles from the mine, but which is at an elevation of three thousand feet less than the head of the tramway. The company will utilize the drag of the ore buckets down that 3000-foot incline for the development of power to run the sawmill and electric light plant at the mine. At Ox Bow the copper smelter will be located. The buildings in which the smelter at Cuprum is constructed will not be moved, but the machinery will be taken to Ox Bow, and with additional machinery and improvements will be used.

"It is not surprising that good strikes should be made at a depth of 600 feet in any Lower California, Mex., mine," said a gentleman of San Diego, Cal., familiar with mining properties not only on the peninsula, but in this country. "It has been demonstrated already that all mines in Lower California below the 300-foot level show up well, and the same can be said of mines on the desert, both in Lower California and in this country. I have never seen it fail. After the 300-foot level is passed the ore is invariably rich and permanent."

The Pan-American Mining Co., which bought some years ago the tailings dump deposited by the Prietas mill, in the southern portion of Sonora, Mexico, when worked in former years by the old original company, have worked out all their ground—using the cyanide process—and suspended operations. Mr. J. E. Beveridge, who was in charge of the work the past three years, has returned to his home in Salt Lake City, Utah. It is understood that the operations of the company have proved profitable.—*Nogales Oasis.*



THE LIVERPOOL HOISTING WORKS.



## CORRESPONDENCE

## CANADA.

## Canadian Gold Mines.

(From our Special Correspondent.)

There has been a new development in gold mining in what is called the Sharbot Lake district, near Ardoch in Clarendon, which promises very good returns, as the ore is very rich and comparatively free milling. On the surface, these ores contain a great deal of arsenical pyrites, but as they gain depth the arsenical ore seems to be replaced by iron pyrites, which carries some of the rarer bismuth mineral in small quantities. They have organized the Boerth Mining Company in Detroit to work these properties. They are working about fifty men on the development, and are building a patent process mill. They are sinking three shafts at the present time, and all of them are in rich ore, averaging about ninety dollars, although very little free gold is seen by the eye, and the amount of sulphurets contained in the ore is only about two per cent. It is probable that they are working on especially rich shoots, although the shafts are about a hundred feet apart. They have indications of a large vein and a great deal of ore opened up which will run from five to forty dollars, so that even if their patent process should prove a failure, the mine can be worked by the usual method and make a success.

Since this strike has been made several other companies are buying lands in the neighborhood.

This discovery is rather interesting on account of some of the veins in the neighborhood carrying a large percentage of bismuth. The veins occur as bedded veins in the mica-schist and also as gash or fissure veins cutting across the formation. It is rather early to predict what the future of these mines will be as the shaft is but thirty-six feet deep, but for the work done, the property makes a very fine showing, and will tend to revive the interest in this section, which has languished for some time, on account not only of the difficulty of treating the arsenical ores, but also because the properties of the Marmore district have found these arsenical ores do not carry a uniform tenure.

## UTAH.

(From our Special Correspondent.)

SALT LAKE CITY, Dec. 5, 1898.

DEAR SIR:—The Utah mining stock market continues active. I think the way seems clear for a prolongation of the present upward movement, and particularly for the taking up of a number of stocks which have been neglected in the present upward movement.

The Ajax stands steady at 65 cents, but there are no transactions in the Alice. There is no activity in the stock of the Alliance; the same can be said of Anchor, while Buckeye is on the increase. Bullion-Beck was the one weak spot on the list, and no favorable reports are coming in from the property. Centennial-Eureka stock is inactive, but will in all probability show an advance this week. Chloride Point is stronger, Dalton was active, Daly strong and in demand, Daly-West was not traded in, Dexter advanced strongly; Eagle, of Mercur, was strong and in demand, while the Eagle and Blue Bell stock advanced rapidly and closed at the highest point. Four Aces was a trifle weak, but I look for shares to go higher later on.

Galena slumped badly from no apparent

cause. Geyser-Marion was picked up quietly whenever offered; the stock advanced rapidly and sold at the highest point for months.

Grand Central simply soared; the last sale was \$8 and it may go higher. Horn Silver sold at \$1.20. Joe Bowers closed a trifle soft; the demand for the stock is coming from good sources, but the majority of holdings are in weak hands. Little Pittsburg was strong at last week's figures. Lower Monmouth was in high favor and very active.

Mercur advanced rapidly on limited sales; never in the history of the company have I known the supply of floating stock to be so limited. Northern Light continues to be the most active security on the list; the stock has a number of recessions, but on every advance touches a higher point; the insiders have been the most persistent buyers. Ontario is very strong, selling at \$7.25, and with but little stock offered.

Sacramento was steady and in demand. Sunshine was strong, but South Swansea a trifle weak. Utah was in favor, while Valeo was very weak, though no doubt will soon pick up a little.

## WISCONSIN.

## Recent Activity in Lake Superior Copper Mines.

(From our Special Correspondent.)

The recent unprecedented advance in the value of copper stock and copper properties on the south shore of Lake Superior seems to be on a steady increase. The renewed interest started from the discoveries made on the Baltic mine on ground that had not been considered of value in the early days. This property was financed by Mr. Cameron Currie, the well-known broker of Detroit, and Mr. S. L. Smith, one of the prominent capitalists. The stock was put on the market at five dollars to furnish a working capital, and although it now stands at twenty-six, it is said by those who have seen it to be far below its real value as compared with other stocks that are selling at a high rate, and whose success simply depends, so far, on the boom. The fact of the Baltic's success and that the Standard Oil people have taken up some of the copper properties has given a fictitious value to every piece of abandoned property in the Lake Superior region, and as copper can be found throughout a territory extending several hundred miles, there is no end to the opportunities for new copper companies, although much of this territory was thoroughly explored in the early sixties.

The old Minnesota mine, under the name of the Michigan, was financed in a small way by Mr. A. M. Lowe of Detroit, and they have spent some thirty thousand dollars in new developments under the superintendency of Mr. Samuel Brady, M. E. They are said to make a very fine showing, and it is whispered in Detroit that they will call on Mr. Cameron Currie, who at present is considered the most successful financier in such matters, to aid them in a more substantial reorganization. It is proposed to furnish a large working capital to sink below the old workings and develop the new ground. As this mine has an excellent record, and had only reached a depth of thirteen hundred feet, the possibilities of the ground are well worth any expenditure that may be made.

There are active inquiries for this stock and there is no doubt that it will rapidly increase in value when offered.

On the Canadian side there is also considerable development in copper properties, the

most important work on this side being done by Lord Douglas at the old Bruce mines. This property has been lying idle since the seventies, at which time they had a caving-in of one of the important shafts, when the company, through a good deal of mismanagement, was unable to recover itself. I think the general impression with regard to this property was that it was no good, having been worked out, but Lord Douglas has taken hold of the work of prospecting it very systematically, and has spent a large sum of money, said to be seventy-five thousand dollars, not only in opening up the old works, but proving up the lode at new points.

Anyone now examining the property would be surprised at the large amount of copper ore that has been developed. It has recently been reported on by Dr. Hatch of England, who makes a conservative but favorable report and recommends that it be developed on a large scale.

The stopes in this mine show from six to nine per cent of copper, while the average of everything in sight is a good working grade, even for a sulphuret ore. No doubt it would surprise most copper men, who have undoubtedly held the opinion that this was a worked-out mine, to see the large amount of ore developed and the great possibilities of the property, as it has hardly been touched yet, the deepest shaft not yet having reached four hundred feet, and there is a mile or more of good development on a large sized vein, or rather system of veins. The Lake Superior men are apt to neglect mines carrying sulphurets, and do not take into consideration that in this favorably located district, that the difference between sulphuret and native ore should not be over two per cent of copper in favor of the latter, yet mines containing eight or ten per cent of sulphuret ore are neglected at the present time.

At Rock Lake, about ten miles to the north of the Bruce mines, there is considerable development being made on a large vein of sulphuret ore, and the owners are putting up the necessary buildings preparatory to working the property on a large scale. They have opened up a seventeen-foot vein, some parts of which are very rich in good ore, and the great showing of iron on the surface of this property, which can be considered as the "iron hat" of the German miners, the great improvement in copper at the slight depth they have gained, as well as the experience of this region warrant the belief that when depth is attained, the percentage of copper will increase in these veins.

There is more or less development of copper along the north shore of Georgian Bay, but nothing as yet has established a reputation of being anything more than a small prospect, until one reaches the copper-nickel deposits of Sudbury district.

Should the excitement in copper continue, many of these properties will be more actively developed the coming summer.

WM. M. COURTIS.

Detroit, Michigan.

## Miscellaneous Mining News.

## ALASKA.

The Ebner is erecting a new 20-stamp mill in the gulch leading up to Silver Bow basin, and is about to start a tunnel from the level which will tap its ledge at great depth. Further up the same gulch the Alaska-Juneau Company has 30 stamps at work on the ore



from a great open quarry of slate full of veins of quartz carrying free gold. They simply quarry out the whole mass, sort out the quartz, send it to the mill and throw the slate over the dump.

## ARIZONA.

New machinery is being placed in the Vekol mine, as the electrical process did not work satisfactorily. The Vekol has already produced \$17,000,000 in silver, this having been mined by crude methods. The mine is yet but a prospect, so far as the ore body is concerned. It is one of the rich mines of the world.

The Congress mine has reached a depth of 1700 feet; Crowned King, 1000 feet; Planet-Saturn, 700 feet; Little Jessie, 500 feet; McCabe, 500 feet; Jersey Lily, 450 feet. Every gold mine in Yavapai county, with two exceptions, that is now working at a profit, has been developed and equipped by the wealth taken from the mine.

## CALIFORNIA.

### INYO COUNTY.

#### Ballarat Notes.

Superintendent Harrison is expected to resume operations on the Cleveland mine in a few days. As depth is attained the mine shows higher grade gold ore and width of vein increasing.

Mine owners in South Park district are in nearly every instance doing work on their claims and meeting with encouragement as their work progresses.

At Tuba and Goal canyons all the mines appear to improve as depth is attained.

Two important sales are now being negotiated, and if brought to a successful issue lively times may be looked for before spring.

At Mineral Hill, Richard Day, Superintendent of a group lately purchased, is meeting with success in his preliminary development work.

John A. Shaw, in charge of mining property purchased by Kern county parties, seems to be very sanguine as to the future of the property he is managing.

Taken as a whole, this section has every indication of becoming one of the most important gold-producing sections of the state.

### SAN BERNARDINO COUNTY.

The Grant Brothers, Michigan mining men who have secured control of the Rose mine, 50 miles from Victor, have sunk a new perpendicular shaft on the property, thereby avoiding the handling of the ore extracted from the lower workings so many times before reaching the surface. The cyanide tanks used in working the tailing of this mine last spring will be moved up the mountain to the new shaft house, and the low-grade ore will in future be worked by the cyanide process. The rich streak which accompanies the vein will probably be shipped.

### SAN DIEGO COUNTY.

Mesquite, on the Southern Pacific, was formerly a rich dry placer camp, but on account of recent discoveries of rich ore in fair quantity, the result of the last year's develop-

ments, has developed into another permanent desert mining camp, with six resident families and three saloons. This section requires a pumping plant and mills to make its ore bodies remunerative.

An exchange says: The mines at Venus camp, Picacho district, owned and operated by H. W. Blaisdell of Yuma, who has a fifty-ton cyanide plant at work extracting the yellow metal from the ores, are proving an unqualified success under Mr. Blaisdell's management and the superintendence of Mr. Frank Guerra—a success fully justified by the enterprise and good judgment displayed by the owner. The second monthly clean-up was made a few days ago, and the value of the bullion brought down was said to be \$35,000, while the expenses were about \$12,000. The previous month's run was \$29,000.

New life has been instilled in the Cuyamaca mountains. The huge pile of tailings of the great old Stonewall mine will be worked by cyanide, and no doubt a handsome clean-up can be expected. In the palmy days of this mine the operators did not think it economy to save the values as close as possible, believing that if a greater amount of ore could be put through the mill and not so high percentage of extraction obtained, more money could be made. As a natural consequence of this procedure, the tailings are rich and the present engineers, Robert, Strauss & Co., who are instituting these operations, expect a good return for the money invested.

## COLORADO.

The last payment was made November 15th of the \$50,000 debt of the Argentum-Juniata Co. at Aspen, Pitkin county, and the company starts anew with bright prospects before it.

The mine itself is said to now be in better condition than ever. The ore bodies are large and well developed, awaiting only the breaker to convert them into cash through the process of concentration. All of the ore is of good average value, and in addition it is stated that the mine has recently developed one fine body of high grade stuff, averaging between 300 and 400 ounces and being nine feet in width.

The remarkable success of the company in getting out of debt and on the high road to prosperity is attributed solely to the mill and its splendid work. It is doubtful if such satisfactory results could have been achieved without its aid. Its tailings help to make the Roaring Fork a muddy stream, but its product also helps to sustain the life and energy of the people of Aspen. If it were not for the A.-J. mill and the several others now handling the low grade ore of the camp (the only kind there is left in the mines) Aspen's place on the map of Colorado would not be the size of a pin point.

The working force at the Gregory-Bobtail, one of the Gilpin county producers, now numbers 75 to 100 men, and a large tonnage is being taken out. The incline is being extended so as to cut the Briggs shaft and this work is being prosecuted in four places, so as to hasten its completion. When the incline is down to the Briggs shaft it will do away with the extra hoisting of ore through the latter shaft, and one hoisting will do the work hereafter. A large duplex pump of the Knowles pattern, with a capacity of 700 gallons per minute, is being placed at the bottom of the Briggs shaft, a depth of 300 feet below the

900-foot level of the incline. Manager Collins says that he has a force of men at work both sinking and up-raising on the Bobtail, and some good results are sure to be obtained when the connections are made and the prospects of this property look brighter now than they have for quite a while.

### Record Year.

This has been a record year for Cripple Creek.

Every month has gone the previous one a point or two better in the matter of production.

In the matter of dividends this rule does not apply, but it can be safely said that in this connection every month has been far ahead of the best month in 1897.

November caps the record for dividends of any month in any period of Cripple Creek's history. The total is well over \$300,000—over \$30,000 better than the previous best, and is made up as follows:

Victor.....	\$100,000
Portland.....	69,000
Little.....	35,700
Strong.....	25,000
Appie Ellen.....	25,000
Golden Cycle.....	15,000
Associated.....	11,000
Gold Coin.....	10,000
Modoc.....	10,000
Montreal.....	7,500
Eldorado Leasing.....	1,000

Total \$318,250

The previous next best month to this was in February last, when, owing to a dividend declared by the Orphan Bell company, out of part of the purchase price paid for the property, the total ran up to \$283,100. The November dividends are, however, all from earnings with the exception of the \$25,000 credited to the Appie Ellen Company and \$7,500 to the Montreal company, which is much more than offset by the \$92,000 of the Orphan Bell company in February.—*Colorado Springs Investor.*

## GEORGIA.

Dahlonega is undoubtedly the coming mining section of Georgia. But little is known of it in the western United States, and if reliable data could be obtained pertaining to the operations carried on, the number of men employed in and about the mines and surrounding country prospecting for minerals and developing prospects already discovered, it would cause no end of surprise to the miners of the west, some of whom did not even know there was such a place.

What is considered the largest gold mining deal ever made in the vicinity of Dahlonega, was consummated in the latter part of October, when the Hand & Barlow was secured by a new and wealthy syndicate, but the particulars have not as yet been made public. The Hand & Barlow property is possibly the largest and was formerly the most successful mining scheme in that section of the country.

## IDAHO.

J. N. Rice of Florence has brought suit for one-fourth of the original Buffalo Hump discovery on the basis that he held a grub-stake interest in any discovery or location made by Rigley during 1898, and claims that he holds receipted bills showing that he paid for the



outfit that was used at the time of the Buffalo Hump discovery. This is the property for which Capt. De La Mar offered \$500,000. The litigation will tie up the property for an indefinite period. Mr. Rice has banded his interest to Spokane parties and a stock company is being organized there.

## MICHIGAN.

At Rockland, Ontonogon county, the equipping of the Michigan mine, under the able and conservative management of Supt. Samuel Brady, is proceeding in a very substantial manner, and it will be but a few days now when the new machinery being installed is enclosed.

The Brotherton mine, at Wakefield, Gogebic county, has been having a large amount of water to pump the last season, due to the stoppage of its near neighbor, the Sunday Lake, says *Iron Ore*. It costs 18 cents per ton of the ore hoisted to pay the water charges. Add to this a royalty, and consider the smallness of the ore deposits, and it will be seen that the company is kept busy securing a new dollar for an old one. The company expects to be active during the winter and looks to a division of its pumping charge by a resumption of mining operations at the Sunday Lake. The latter property has consolidated with the Iron Chief and will soon be busy again.

## MINNESOTA.

Mr. Joseph Sellwood, of Duluth, was in Ishpeming, Mich., last week, on his way home from Chicago. He says the Minnesota fields will contribute about six million tons of ore for the year soon to close. They would have done considerably better than this but for the scarcity of labor. Next season they expect to ship seven million tons.

The Chandler sent out 750,000 tons and has 150,000 tons left in stockpile. There were 250,000 tons carried over from last season. The Pioneer has finished pumping, and is just beginning to hoist ore. Work is also progressing at the Zenith.

## MISSOURI.

### Mines of Joplin.

Crane, Cooper & Co. have struck good jack at 96 feet in their new shaft in Leadville Hollow.

Since the first of May, the Newsboy, at Duenweg, has made and sold over \$100,000 worth of lead and zinc.

F. D. Bendruf has bought of Jap Vansil and Robert Jeffries one fourth interest in the Grubworm, for \$2,800.

The shaft of Brewer Bros. & McGehee, at Tuckahoe, has been sunk to 175 feet, and they are now cutting on a good face of jack.

A large-sized Star drill is at work prospecting a tract of land one and a half miles north of the Zenith plant in Newton county.

Meeker and Savage on the Pinkard, have put in a pump and other machinery in their new shaft and are ready for active work.

After drifting fifteen feet, the Vesuvius, on the White Oak, has struck a good run of lead, and their first turn in from three shifts was \$9,040.

John D. Gougar, of Lafayette, Indiana, has purchased a one-tenth interest in Houk & Co.'s tract.—*Joplin Herald*.

## MONTANA.

The deal for the sale of the Nancy Hanks mine, which was being engineered by Butte parties, is declared off. The Nancy Hanks mine is located at Garnet, and Sam J. Ritchie, its owner, is at present in Butte. The mine is said to be a phenomenal producer of high grade ore, nearly all of which is shipped to Butte. It is understood that W. A. Clark of Butte has had experts examining the property for some time and that an offer of \$250,000 for the mine has been refused by Mr. Ritchie, the terms not being satisfactory.

It is reported that the workmen at the property of the Conrey Placer Company at Sheridan, engaged in sinking a shaft to bedrock, have attained their object at a depth of 35 feet. When the miners had pierced the layer of cemented gravel which baffled the placer machines, it is said they encountered a wash different from any yet found in Alder gulch. The gold dust, which is more plentiful and coarser than that found above the cement bed, is also of a different quality. The bedrock encountered is of a soft, soapstone formation. This find beneath the cement opens up a new field for speculation on the wealth of the Ruby and the theory held by many that untold millions lie amid the sands resting on the bedrock of the valley. For ages the erosive powers of hundreds of streams and gulches have carried down the burden of their waters and deposited it in the valley below. From the head of the Ruby to its mouth, every gulch and stream and gully putting into it from the Tobacco Root and Gravelly ranges, that have been prospected, have shown the presence of gold. In some places it was in small quantities and would not justify the working. But, on the other hand, an Alder gulch, yielding millions in gold, was found.—*Helena Independent*.

## NEW MEXICO.

### Output of Hillsboro Mines.

Output of Hillsboro gold mines for the week ending Thursday, December 1, 1898, as reported for *The Advocate*:

	TONS
Wicks.....	35
K. K.....	30
Richmond.....	55
Snake Group.....	80
Opportunity.....	30
Sherman.....	5
Cincinnati.....	25
Tripp.....	85
Rex (silver-lead).....	15
Total.....	360

Total output since January 1, 1898—9,150.

## NEVADA.

### New Pass Mines Sold.

J. F. Mitchell, formerly superintendent of the Austin Mining Company, has purchased from Hon. T. J. Bell the Superior and Gold Belt mines, situated at New Pass, and has made the first payment to bind the bargain, says the *Reserve River Reveille*. Mr. Mitchell has also made a payment on the group of mines belonging to Messrs. Ryan, Sutton, Murphy & Co. The second payment to be made in 60 days.

The mines purchased are gold bearing and

the ledges very large and the ore free milling, with enough in sight to keep a large mill running for many years, and we predict that there will be 150 miners at work in the New Pass mines within the next 18 months.

## OREGON.

The miners at work in the Collateral mine in the Virtue district have struck an ore body, and from all appearances the vein is the Collateral ledge, and this with other prospects in sight warrant the statement that the Virtue Consolidated Mines Company will soon be able to start their mill on a steady run of good ore.

Rich ore was taken from a stringer of ore in the Carroll B. mine, in Mabel district, 12 miles southwest of Baker City, at a depth of 50 feet from the surface, says the *Baker City Democrat*. The ledge at this point is 2½ feet wide with the rich pay streak running through it.

The Carroll B. is in close proximity to the Mabel mine, from which upwards of \$20,000 were taken from a shaft not more than ten feet in depth by Mr. Baisley a few years ago.

## SOUTH DAKOTA.

### Phonolite Ore Discovered.

O. U. Pryce, recently of Cripple Creek, Colo., and well known in the Black Hills, made the startling fact known this week that he had discovered a large area of country, up in Deadwood Gulch, about four miles from Deadwood, in which there is to be found a large amount of phonolite rock. There are a great many prominent cliffs and dikes in the district, which have always been considered by mining experts to be porphyry. Mr. Price is familiar with the Cripple Creek country and knows phonolite when he sees it. He spent two or three weeks up in the district in Deadwood Gulch, making careful examination of the formations and making assays for values from the different shoots of ore which he found.—*Black Hills Mining Review*.

## UTAH.

The Sacramento Company of Mercur paid its regular dividend, \$5000, on the 1st of December. The mine is looking well.

The Swansea Mining Company of Silver City, in the Tintic district, it is declared, will pay a double dividend on the 15th of this month.

The latter part of this month it is expected that the Daisy Mining Company of Mercur will pay its initial dividend. The mine is said to be in splendid condition.

The last shipment of ore from the Ajax mine at Mammoth was one of 100 tons, being a very high grade copper ore. The developments at the mine are being kept well in advance.

## WASHINGTON.

The Republic Mining Company last week declared its regular monthly dividend of \$30,000, payable December 10th, says the *Spokane Miner and Electrician*. This is the third dividend, one each in the past three months, and with the increased plant now



being installed it is quite probable the returns to the fortunate stockholders will be greatly increased.

A rich strike is reported on the Golden Harvest, in Republic camp, the long tunnel showing a full face of ore averaging from \$30 to \$40. The tunnel is now in over 400 feet, and has been driven all the way on the ledge, finally reaching the looked for ore chute, with splendid results. The claim is owned by James Harvey, superintendent of the Republic, and others.

## FOREIGN MINING NEWS

### BRITISH COLUMBIA.

Extracts from D. C. Mining Critic.

#### SLOCAN.

The Dundee mine, near Ymir, recently made a test shipment of 20 tons to the Hall mines smelter, which gave returns of over \$50 per ton, an increase in value of 40 per cent. over the last shipment. The ore came from the 150 foot level.

#### KAMLOOPS.

Since bornite was struck in the crosscut at the 160 foot level in the Pothook, men have been working night and day, and are not yet through the ore, which continues to improve. They have now gone 19 feet in the ore and have drifted 14 feet along the vein. This strike has encouraged many claim owners to go ahead with work on their claims, and a large amount of assessment and development work is now being done on the hill.

### LOWER CALIFORNIA.

The steamer S. Denis brings news of a very rich strike in the mines of the Ybarra Gold Mines Company at Calmalli, 300 miles south of San Diego, in Lower California. The rich ore was encountered at a depth of 600 feet and caused considerable excitement in a camp where rich strikes have been common for the past ten years. The owners of the mines, who are almost without exception San Francisco men, have ordered additional machinery from that city, and the schooner Anita is now loading there for the mines.

### MEXICO.

At Pilares, in eastern Sonora, the Le Roy Mining Co., of which Mr. McKim is general manager, is operating its property on an extensive scale and there is sufficient ore now in sight to work on for the next five years. The company has 500 tons of high grade ore running from 600 to 3,000 ounces, already sacked and ready for shipment, and considerable delay is being experienced on account of the scarcity of packers.

The queen of the mines at Pilares, however, are those owned by Col. Francisco H. Garcia, chief of staff for President Diaz. His property consists of 1,800 pertenencias, equal to 4,500 acres, of which thirty pertenencias are leased to Messrs. King and Newman of El Paso. These latter gentlemen are working on about fifty different places on their leased ground, and are taking out and sacking two tons of fabulously rich ore every day. The ore running less than 600 ounces is put on the dump, where there are 100 tons of it awaiting transportation.

### THE BURIED RIVERS OF CALIFORNIA AS A SOURCE OF GOLD.

(By J. R. Scupham, San Francisco, Cal.)

(Continued from our Issue of December 1st.)

Through geological ages, the processes of nature seem to have tended towards a gradual concentration of metals. Chiefly is this the case with gold. First, we find it disseminated in infinitesimal quantities in all the waters of the ocean. By precipitation, slate-rock is formed under the bed of the sea, and the gold from the ocean waters is concentrated in the slate rock. The slate subsequently upheaved in continental masses and fissured in the upheaval. The fissures become the waterways through which flow thermal waters from the lower depths of the earth. These waters leach out the silica and the gold from the enclosing slates and deposit them in the form of quartz veins which fill these fissures. When the valleys are deeply capped with the volcanic flow, these same thermal waters may find their way into the ancient channels and meeting there with organic materials, which forms the condition favorable for the deposition of their metallic charge, they would begin and continue the formation of nuggets about some metallic nucleus, and thus in the course of hundreds of thousands of years during which these conditions have existed, this deposition of gold has been going on in these ancient channels. The deposition of gold in this manner by the successive plating of nuggets, as is proved by experiments, requires the presence of organic material. Such was always to be found in the channels where bedrock gravel existed and was chiefly in the form of wood, leaves or vegetable loam. Although we also find buried in the volcanic material other channels filled entirely with lava gravel, i. e., rounded water-worn pebbles of volcanic material, yet these channels are entirely barren of gold, as they were necessarily barren of organic material. The same water that contributed to the accretions of gold in the channels carrying bedrock gravel, would flow through these channels of lava gravel and would there make no deposition of their metallic contents.

This method of the accretion of gold nuggets in place has been pointed out by Mr. Daintree of the Victorian Geological Survey, also by Chas. Wilkinson, by Prof. Newberry and Mr. J. C. F. Johnson in his work on "Getting Gold," published in London this year, and indeed no one can make a careful examination of the gold nuggets taken from these ancient river channels without being compelled to believe that this is the mode of their formation. Some of these nuggets show beautiful and delicate filigree work, which could not have existed on them at all if they had been moved by the water a single foot through a sand or gravelly bed. I have myself lately seen nuggets weighing from half an ounce to more than an ounce taken from the "Specimen Mine," in Byrde Ravine near Michigan Bluff, composed entirely of a plating of scales, each one of which was nearly a perfect crystal of gold, and which could have been formed in no other way but by the slow electro-plating process of nature. But, this theory of the origin of the gold nuggets has been fully argued and proven too, I think, in the treatise by Mr. Johnson which I have before mentioned. It seems perfectly evident to me from my personal observations, and I will not go into the argument here. I will only say that this theory explains satisfactorily how it is that all the channels containing bedrock gravel, which

are buried deep enough in the volcanic material should be auriferous. For the benefit of the miners, I will give the following instances, showing from practical experiences the gold obtained from drift mining on these channels.

In the case of the Bald Mountain Drift mine, situated in Sierra county, California, the ground was purchased at a cost of \$20,000. About the same amount was spent, running a tunnel into the ridge to strike the channel. The channel was found to be about 300 feet in width with from 4 to 6 feet in depth of pay gravel. The company worked the channel by drifting, that is, by mining out the gravel and washing it at the mouth of the tunnel, and in this way cleaned up the channel for a length of 4,200 feet. The gravel so mined yielded \$2,581,740, and enabled them to distribute in dividends \$1,003,000. (See 9th Report California State Mineralogist, page 121.)

At Ayer's claim, near Michigan Bluff, a portion of the bedrock of the channel, 100 feet in length by about 35 feet in width, yielded \$30,000. Mr. Perkins, the agent for Wells-Fargo's Express Co. at Michigan Bluff, in 1871, reported that the shipment of gold mined from the ancient channel in that vicinity, in five years had amounted to \$7,500,000.

In the ancient channel opened under Table Mountain, in Tuolumne county, a portion of the gravel yielded at the rate of \$3,000 per square yard of bedrock cleaned. All these are examples of the richer gravel found in these ancient channels. None of the channels carrying bedrock gravel are ever found to be entirely barren, but the gravel in some of the larger channels carries very much less gold than the above examples, yet, even these are worked to advantage.

In the Hidden Treasure mine, which is operating through a tunnel more than 3,000 feet in length, there is a breast of uncemented gravel, 5 to 6 feet in height; from 800 to 1,100 feet across the channel, this gravel is extracted at a total cost of 71 cents per ton carload, and though the gravel yields only about \$2 per car load, the property has been paying handsome dividends for many years. In many cases, material composing the pay gravel has been cemented together by the action of the thermal waters and powder has to be used in the breasts. It is necessary, also, to pass all the material through a stamp mill in order to extract the gold. Yet, even in this case, gravel yielding less than \$4 per cubic yard is worked at a profit. There are special stamp mills for the purpose of crushing cement gravel, having extra wide mortars and discharging through screens quarter-inch apertures. These are capable of crushing from 5 to 10 tons to the stamp head, varying according to the character of the gravel. In some instances, by the erosion of the ridge in which the ancient channel is enclosed, the gravel in place is exposed on the slope of the ridge, or, as miners term it, "the channel breaks out" at such a point. It was in this way that these channels were first discovered. When this occurs, it is easy following the channel in under the lava cap with drift tunnels. This constitutes the simplest kind of mining, as there is practically no dead work to be done. But, as the lava capping is usually from 400 to 1,000 feet in depth, it is generally necessary to pierce the ridge with long tunnels in order to reach the buried channels. These tunnels are sometimes from 2,000 to 6,000 feet in length and cost from \$8 to \$15 per foot. When a mistake is made in the elevation, and the tunnel



strikes the channel too high, it is generally useless, as there is so much water to handle in the old channels that gravel cannot be profitably extracted through a winze sunk at the end of a long tunnel. In a case like this, there is nothing to do but to find the right elevation and run another tunnel. The money expended in running the tunnel is wasted. Often, however, the companies have exhausted their resources before they are able to correct such mistakes.

Some of the channels are being profitably worked through vertical shafts sunk from 400 to 600 feet down through the lava cap. In this case, all the water, as well as the gravel, must be raised to the surface, and only the richer class of gravels yield good results when mined in this manner. In spite of all the work that has been going on, only a comparatively small proportion of the total length of the buried channels has been worked. In the more favored localities, like that of the Forest Hill Divide, the channel has been worked at different points a few miles apart, and the grade and the elevation of the ancient channels thoroughly determined. This circumstance makes claims on this ridge much more valuable than they would be at other points, for the reason that working tunnels can be located with certainty, and there should be no danger of blank failures resulting when they are extended far enough to strike the channels. At present a good deal of attention is being given to this kind of mining in California, and some new enterprises are being started up.

## PERSONAL NEWS ITEMS

P. BAILEY EASTWOOD, the Transvaal, South Africa, mine owner, has been stopping in San Francisco, Cal., the last few weeks.

W. H. CORBOUL, general manager of the Canadian Exploration Company, who has been at the company's headquarters in London for a year, and who recently returned to Rossland, and the Porto Rico mine at Ymir, has gone to Colorado, New Mexico and points in the southwest on an extended trip.

MANAGER GRUBBS of the Banco Minero, at Parral, says he expects to ship a million dollars worth of silver bullion from Parral the coming year. The Hidalgo Mining Company, which heretofore has been shipping from three to four hundred thousand dollars' worth, alone, is doubling its capacity, and other companies are largely increasing their output.

J. K. HAWK, secretary of the Colorado & California Mineral Development Company, has just left for the mines of the company located in San Bernardino county, Cal. Mr. HAWK will do the necessary assessment work remaining due and having taken CHAS. E. WALKER, an ex-mineral surveyor of Colorado, along, will run the lines of the property.

W. W. ALLEN, general manager of the Pueblo Smelting and Refining Co. of Pueblo, Colorado, was in Los Angeles, Cal., last week.

JOHN Q. MACDONALD, former general manager of the Beneficiadora del Concheno, at Concheno, Chihuahua, Mexico, is now employed at the Rose mine, fifty miles east of Victor, in San Bernardino county, California.

R. H. LACY, secretary of the Lacy Manufacturing Co., office Room E, Baker Block, Los Angeles, Cal., says business in his line is picking up wonderfully in the last few months. Cyanide tanks for the mines of Southern California and Arizona is an important item of the business handled by this house and no doubt there will be much of this class of work turned out in 1899.

Mrs. McCOSKILL of Los Angeles, Cal., received a sack full of gold nuggets from her husband at Dawson, N. W. Territory. One of them was valued at \$50.00.

W. HOYTENIA, a mining expert and capitalist of San Francisco, has been examining mining properties in the Cleveland district, Lander county, Nevada.

WADK & WADK, assayers and chemists of Los Angeles, Cal., are now preparing for the general mining public and those interested in metallurgical subjects, a book entitled *A Compendium of Gold Metallurgy*, giving an outline and much of the details of the various metallurgical operations employed in working ores. As an appendix it will contain considerable information on the subjects of assaying, prospecting and weights and measures, also various tests by amalgamation useful to a prospector in the field. This little treatise will be ready in about two or three weeks.

JESSE J. MACDONALD, representing the Gold and Silver Extraction Co. of America, Ltd., controlling the MacArthur-Forrest Cyanide patents for the United States, after looking Southern California over thoroughly, says, "I am surprised at the magnitude already attained in the use of cyanide in that particular section of the country; it seems to have supplied a long-felt want, and I am here to investigate, promote, protect, advise and in a general way assist all who wish to use or experiment with our process in the treatment of their ores." Mr. MACDONALD is a cyanide expert both practically and theoretically, having been in the field for the past seven years, erecting and starting plants in all parts of the United States. He has decided to make Los Angeles, Cal., headquarters for some time.

### CALIFORNIA MINING LOCATION NOTICES.

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maker's hands are comparatively small.  
Blue vitriol is scarce, and up to \$3.87½ is  
asked for the best grades, while ordinary  
kinds are hardly being offered. Imports  
included 95 bbls. and 30 casks oxalic.

Quotations are per 100 lb from New  
York and vicinity as follows: Acetic  
acid, commercial, No. "8," \$1.40@1.50;  
muriatic acid, 18°, \$1.10@1.75, 20°,  
\$1.20@1.87½; 22°, \$1.35@2.25; ac-  
cording to quantity and brand. Nitric  
acid 36°, \$3.50@4.75; 38°, \$3.75@  
\$4.62½; 40°, \$4.00@4.87½; 42°, \$4.62½  
@5.25. Oxalic acid, \$6.50@6.75.  
Mixed acids, according to mixture. Sul-  
phuric acid, 66°, \$1.10 for drums and  
\$1.15@1.75 for carboys. Chamber acid  
50°, in jolbing way, \$11.50@12 per ton  
f. o. b. factory. Blue vitriol \$3.50@  
\$3.62½ for extra grades and \$3.37½ for  
ordinary.

## BRIMSTONE.

Spot brimstone is very scarce, and  
small buyers are obliged to pay as high  
as \$24 and \$26 per ton for best unmixed  
seconds, and about \$1 less for thirds.  
Large buyers are however favored with  
much lower prices, and quotations by  
importers are \$22.50 and \$23 per ton  
for best unmixed seconds on spot, and  
\$21 and \$21.75 for futures; thirds are  
\$19.50 to \$20 to arrive.

## NITRATE OF SODA.

Buyers and sellers of nitrate of soda  
are still to far apart to come to any  
large sales, though about 5,000 bags  
were sold recently at \$1.52½ per 100 lbs.  
Sellers are quoting up to \$1.55 for spot,  
and for futures extending through De-  
cember, 1899, \$1.55 to \$1.57½ per 100  
lbs.

## FINANCIAL NOTES.

## Average Prices of Metals

In New York per pound from January 1,

1898	Copper	Tin	Lead	Spelter
January.....	13.87	3.55	4.95	4.04
February.....	14.08	3.71	4.04	4.04
March.....	14.38	3.72	4.27	4.26
April.....	14.60	3.63	4.26	4.27
May.....	14.52	3.64	4.27	4.27
June.....	15.22	3.89	4.27	4.27
July.....	15.63	3.95	4.27	4.27
August.....	16.23	4.00	4.27	4.27
September.....	16.03	3.99	4.27	4.27
October.....	17.42	3.78	4.27	4.27
November.....	18.20	3.70	4.27	4.27
December.....				

## Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st,

1898	1899	1896
Month	Cents.	Cents.
January.....	66.77	67.13
February.....	66.07	67.67
March.....	65.70	68.40
April.....	66.02	67.92
May.....	66.08	67.78
June.....	66.61	68.41
July.....	66.06	68.75
August.....	66.54	67.34
September.....	66.68	66.68
October.....	66.12	66.05
November.....	66.60	66.01
December.....		66.01
Year.....	66.70	67.71

The statement of the United States  
Treasury, on Thursday, Nov. 10,  
shows balances in excess of outstanding  
certificates as below, comparison being  
made with the statement for the corre-  
sponding date last week:

Dec. 1.	Changes
Gold.....	\$241,663,443 I. \$ 698,855
Silver.....	6,731,441 D. 630,848
Legal Tenders.....	14,754,970 D. 944,147
Treasury Notes, etc.....	1,411,798 D. 428,089

Totals.....\$64,563,653 D. \$47,058  
Treasury deposits with national banks  
amounted to \$94,641,001, a decrease of  
\$823,748 during this week.

Gold and Silver Exports and Imports.  
At all United States ports, September,  
1898, and year from January 1st, 1898  
and 1897:

## OCTOBER.

1897	1898
Gold—	
Exports.....	\$113,311
Imports.....	1,775,483
Excess.....	\$1,662,172

1897	1898
Silver—	
Exports.....	\$5,225,437
Imports.....	3,793,433
Excess.....	\$1,942,004

## TEN MONTHS.

1897	1898
Gold—	
Exports.....	\$32,939,802
Imports.....	28,376,319
Excess.....	\$4,563,483
Silver—	
Exports.....	\$4,832,111
Imports.....	24,924,164
Excess.....	\$20,667,431

This statement includes the exports  
and imports at all United States ports,  
the figures being furnished by the Bureau  
of Statistics of the Treasury Department.

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One Copper Plate which is silver plated, 48"x60" and a lot of Piping, Scales, etc.  
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## MINING STOCK QUOTATIONS

BOSTON	
Aetna Con	10 00
Albion	3 50
Algonquin	22 00
Amalgam	2 75
Amherst	2 50
Atlantic	26 50
Baltic	16 50
Bonanza	15
Boston & Montpelier	12 1/2
Breece	1 50
Butte & Boston	23 00
Cabinet & Hecla	585 00
Catalpa	18 38
Centennial	18 38
Dominion Coal	25 00
Dominion Pref	112 50
Franklin	11 10
NEW YORK	
Alamo	03 1/2
Alice	40
Ansett	48
Beat & Belcher	50
Bran swick	05
Bulwer	05
Crown Point	05
Con. Cal. & Va.	08 1/2
Cripple Creek Con	08 1/2
Deadwood	08 1/2
Favorite	11 25
Fortuna	04
Golden Fleece	46
Gould & Curry	46
Hale & Norcross	—
SAN FRANCISCO	
Alta Con	12
Andes	13
Belcher	21
Beat & Belcher	16
Bullion	10
Caledonia	52
Challenge	13
Chollar	68
Confidence	68
Con. Cal. & Va.	33
Crown Point	10
Deadwood	45
Gould & Curry	18
Hale & Norcross	65
Homeside	50
Iron Silver	68
Justice	08

## COLORADO SPRINGS STOCKS

Acacia	02 1/2
Alamo	02 1/2
American Con	01 1/2
Anaconda	37
Argonaut Juniors	20 1/2
Banner	—
Bob Lee	00 1/2
Creede & C	04
Dante	01
Des Moines	01 1/2
Elkton Con	98 1/2
El Paso	07 1/2
Emma Almee	003
Fanny R	21
Favorite	02 1/2
Findley	05 1/2
Flower of the West	005
Franklin	003
Golden Crater	22
Golden Fleece	12
Gold & Globe	01 1/2
Gold Kings	55
Gould	03
Granite Hill	01
Hayden	004
Ingham Con	04 1/2

## SALT LAKE CITY

Alice	75
Ajax	88
Anchor	80
Buckeye	02
Bullion Beck	5 50
Cent Kureka	29 00
Chloride Point	52
Daisy	40
Dalton	003
Dalton & Lark	04
Daly	1 00
Daily West	4 50
Deater	2 55
Eagle	02 1/2
Eagle & Blue Bell	1 00
Four Aces	29
Galena	44
Gemini	10
Geyer-Marion	1 75
Grand Central	6 87 1/2
Homeside	—
Horn Silver	1 15
Little Pittsburg	85 1/2
Mammoth	2 10
Mamfeld	—
Mercur	0 87 1/2
Morgan	—
Northern Light	08 1/2
Omaha	5 25
Ontario	1 85
Overland	—
Richmond Ana	—
Richmond Conda	04 1/2
Rover	—
Sacramento	59
Silver King	28 50
Sioux Con	—
Sunbeam	05 1/2
Sunshine	45
Swansea	2 85
Swansea	1 23
Utah	84 1/2
Valco	58
Young America	50

## ROSSLAND, BRITISH COLUMBIA.

Alecta	10
Big Three	10
Boite	01 1/2
Caledonia Con	06
California	16
Camp Bird	05
Cattle Queen	05
Centre Star	14
Coloma	32
Commander	10 1/2
Deer Park	18 1/2
Della Colla	02
Delaware	12
Eastern Star	20
Enterprise	18
Erie	03 1/2
Rureka Con	08 1/2
Kvening Star	05 1/2
Georgia	12 1/2
Gertrude	08
Golden Drip	15
Good Hope	02 1/2
Grand Price	02 1/2
Great Western	09 1/2
Hattie Brown	03
Helen	04
High Ore	10
Imperial	10
Iron Horse	07
Iron Mask	1 00
L. X. L.	10
Josie Mac	30
Josie	30
Jumbo	37
Knight Templar	05
Kootenay-London	10
Le Roi	10 1/2
Lilly May	18 1/2
Mabel	05
Mayflower	06
Monte Christo	34
Morning Star	08
Mugwump	05
Nest Egg	03
Northern Belle	04 1/2
Novelty	03 1/2
O. K.	10
Palo Alto	07
Phoenix	08
Roanoke	13 1/2
R. E. Lee	15
Red Eagle	08
Red Mount View	03
Rosalia H. West	05
Rosland, Red Mt.	21
St. Kimo	05
St. Paul	12 1/2
St. Peter	02 1/2
Silverline	01
So Cross & W. Con	20
Virginia	1 02
War Eagle Con	2 75
West Le Roi	28
White Bear	68

Iron Clad ... 07 1/2  
Jack Pot ... 05 1/2  
Wheel of Fortune ... 00 1/2  
Work ... 02 1/2

## MEXICO

Name of Company	State	Price
Allanza	Hidalgo	5
Amatitlan y Concordia	"	24
Angelitas	Guanaquato	390
Arcevalo y Anexas	Hidalgo	240
Asturias y Anexas	Zaragoza	170
Barranca y Ceballos	Durango	150
Barro Colorado de Medina	Hidalgo	100
Calderon y An	Zaragoza	20
Cardenilla de Pinos	"	160
Carpuzia	Durango	120
Carmen	Hidalgo	400
Castellana y San Ram	Tepic	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An	Guanaquato	400
Concepcion y Anexas	San Luis Potosi	100
El Oro	Mexico	40
Esparanza y An	Guanaquato	1,300
Huonita	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Maravillas	Hidalgo	100
Pabellon	Zacatecas	150
Palma	"	100
Paralima de los Com	"	5
Real del Monte	Hidalgo	900
Refugio y Va	"	8
Restauradora	Durango	60
San Francisco	Hidalgo	270
San Felipe y Anexas	"	12
San Rafael y Anexas	"	925
do Frae Stock	"	100
San Rafael del Oro	Hidalgo	20
Sta Maria de la Paz	San Luis Potosi	650
Sirena	Durango	50
Solitario	Hidalgo	500
Sorpresa	"	250
Trinidad	Guanaquato	40
Tlaxiango	Puebla	27
Union	Hidalgo	260
Zomelahuacan (gold)	Vera Cruz	100
Zona Min de Pozos	Guanaquato	15

Note—The above Mexican stocks are figured on the basis of Mexican silver

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Inlet Compressor

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16" x 18 1/2" x 24"

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over ten 3/4"

Kelpie drills. The steam cylinders were connected to an in-

dependent jet condenser, for which we are using the mine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

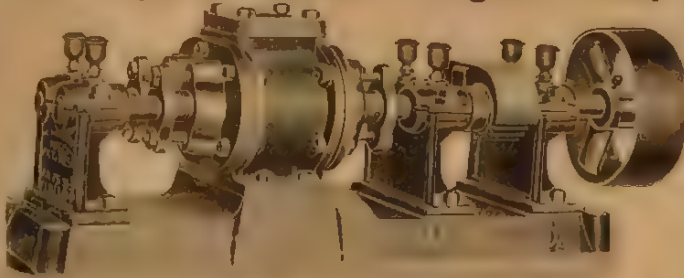
Jas. A. Burns, President

The Ingersoll-Sergeant Drill Co.,

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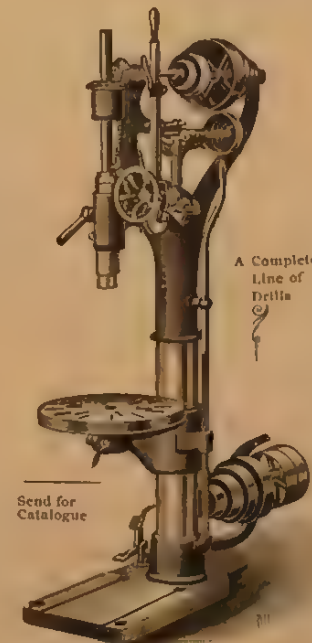
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Silver	40	Gold, Silver and Lead	1.25
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## INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid	Notes
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1898	\$ 1,000.00	G
2	Alaska, Fr. & Well	Alaska	200,000	5,000,000	25	37 1/2	July 1898	3,500.00	G
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1898	200.00	G
4	Aliso	Montana	400,000	10,000,000	25	05	April 1898	1,075.00	G, S
5	Aliso	Utah	400,000	10,000,000	25	05	Sept 1898	2,500.00	S, L, G
6	Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1898	6,750.00	G
7	Anchoria Leland	Colorado	600,000	600,000	1	01	Oct 1898	102.00	G
8	American Gold	Colorado	800,000	3,000,000	10	05	Sept 1898	370.00	G, S, L
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1898	750.00	S
10	Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512.00	G, S, L
11	Big Six	Colorado	500,000	500,000	1	00 1/2	May 1898	1,000.00	G, S, L
12	Boston & Montana	Montana	160,000	3,750,000	25	5 00	Aug 1898	8,125.00	G, S, L
13	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Oct 1898	2,500.00	G, S, L
14	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Sept 1898	500.00	S, L
15	Cariboo	British Col.	800,000	8,000,000	1	02	July 1898	220.00	G
16	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,850.00	G
17	Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010.00	S, L
18	Central Lead	Missouri	10,000	1,000,000	100	1 00	Sept 1898	66.00	L
19	Champion	California	34,000	340,000	10	25	April 1898	295.00	G
20	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165.00	G
21	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	7.00	G, S, L
22	Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,500.00	G, S, L
23	Crescent	Utah	24,000	600,000	25	00	July 1897	280.00	G
24	Crowned King	Arizona	600,000	6,000,000	10	02	Aug 1894	184.00	G, S, L
25	Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925.00	S, L
26	Deerwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,500.00	G, S, L
27	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,151.00	S, L
28	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01 1/2	Oct 1898	8,600.00	G, S, L
29	El Paso	Colorado	850,000	850,000	1	01	Jan 1898	12.00	G, S, L
30	Empire State	Idaho	75,000	750,000	10	10	Aug 1898	15.00	G
31	Fern	British Col.	200,000	200,000	1	05	Jan 1898	110.00	G
32	Florence	Montana	500,000	2,500,000	5	01	May 1897	32.50	S
33	Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	9,000.00	G
34	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Oct 1898	120.00	G
35	Golden Cycle	Colorado	20,000	1,000,000	5	00 1/2	Aug 18 88	155.00	G
36	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160.00	G, S
37	Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	151.625	G
38	Golden Reward	S. Dakota	1,000,000	1,000,000	1	15	Feb 1898	155.00	G
39	Grand Central	Utah	250,000	250,000	1	12 1/2	Oct 1898	176.00	G, S, C, L
40	Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175.00	S, G, L, C
41	Highland	S. Dakota	100,000	10,000,000	100	20	Sept 1898	3,124.718	G
42	Holy Terror	S. Dakota	800,000	300,000	1	03	Aug 1898	108.00	G
43	Honestake	S. Dakota	125,000	12,500,000	100	50	Sept 1898	6,697.750	G
44	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762.252	S
45	Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210.000	S, L
46	Idaho	British Col.	500,000	500,000	1	05	May 1898	261.000	G
47	Iowa	Colorado	1,000,000	1,000,000	1	00 1/2	June 1898	90.000	G
48	Iron Mountain	Montana	500,000	5,000,000	10	1 00	Jan 1898	501.100	S
49	Isabella	Colorado	2,250,000	2,250,000	1	00 1/2	June 1897	270.000	G
50	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160.000	G
51	Kennedy	California	100,000	10,000,000	100	48	Aug 1898	1,796.000	G
52	Last Chance	British Col.	500,000	500,000	1	04	Jan 1897	42.000	S, L
53	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775.000	G
54	Lille	Colorado	1,000,000	1,000,000	1	01	Sept 1898	134.110	G
55	Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735.000	G
56	Modoc	Colorado	500,000	500,000	1	01	Nov 1898	75.00	G
57	Montana Ltd	Montana	600,000	3,300,000	5	03	May 1898	2,997.557	G, S
58	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	July 1898	780.000	G
59	Morning Star	California	2,400	210,000	100	5 00	June 1898	668.000	G
60	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60.000	G
61	Mercur	Utah	200,000	5,000,000	25	12 1/2	Oct 1898	1,191.000	G
62	Mammoth	Utah	400,000	10,000,000	25	05	Sept 1898	1,310.000	G, S, C, L
63	Moon Anchor Gold	Colorado	600,000	600,000	1	07 1/2	Nov 1898	261.000	G
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	July 1898	930.000	G, S
65	Napa	California	100,000	700,000	7	20	Oct 1898	950.000	G
66	New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	80.000	G
67	Ontario	Utah	150,000	15,000,000	100	75	Dec 1897	15,542.500	S, L
68	Oscoda	Michigan	50,000	1,250,000	25	1 00	June 1898	2,272.000	C
69	Parrot	Montana	230,000	2,300,000	10	30	July 1898	2,000.898	C
70	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Aug 1898	31,925.000	G
71	Pioneer	California	100,000	1,000,000	10	12 1/2	Aug 1898	3.000	G
72	Portland	Colorado	3,000,000	3,000,000	1	03	Oct 1898	2,250.080	G, S
73	Princess	Colorado	1,000,000	1,000,000	1	00 1/2	Feb 1897	47.000	G
74	Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120.000	C
75	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	02	April 1897	40.000	G
76	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20.000	G
77	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	2,750.000	S, L
78	Republic	Washington	1,000,000	1,000,000	1	03	Oct 1898	50.000	G
79	Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	Oct 1898	62.000	G
80	Santa Rosalia	California	100,000	100,000	1	10	Feb 1898	125.000	G, S
81	Small Hope Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300.000	S, L
82	South Swansea	Utah	150,000	150,000	1	05	Oct 1898	12.000	G
83	Standard	California	200,000	20,000,000	100	10	Aug 1898	5,714.940	G, S
84	St. Joseph	Missouri	5,000	3,000,000	10	1 50	Sept 1898	2,747.000	S, L
85	Silver King	Utah	150,000	3,000,000	20	25	Oct 1898	1,727.000	S, L, G
86	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350.000	G
87	Smuggler	Colorado	1,000,000	1,000,000	1	01	June 1898	1,015.000	S, L, Z
88	Swansea	Utah	10,000	500,000	5	05	Oct 1898	120.000	S, L
89	Tom Boy	Colorado	200,000	2,000,000	10	10	Dec 1898	60.000	G
90	Tamarack	Michigan	80,000	1,500,000	15	3 00	June 1898	5,331.000	C
91	Victor	Colorado	200,000	1,000,000	5	10	Sept 1898	1,000.000	G
92	Vindicator	Colorado	1,500,000	1,500,000	1	05	Oct 1898	180.000	G
93	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48.680	G
94	War Eagle	British Col.	2,000,000	2,000,000	1	01 1/2	Sept 1898	280.000	G
95	Wolverine	Michigan	60,000	1,500,000	25	1 00	Oct 1898	60.000	C
96	White Water	British Col.	125,000	825,000	5	32	April 1898	194.000	G
97	Yellow Aster	California	100,000	1,000,000	10	03 1/2	Aug 1898	118,780	G

F, Silver. G, Gold. L, Lead. O, Copper. Q, Quicksilver. I, Iron. Z, Zinc.  
N. B.—Companies not listed have not paid a dividend for the last twelve months.



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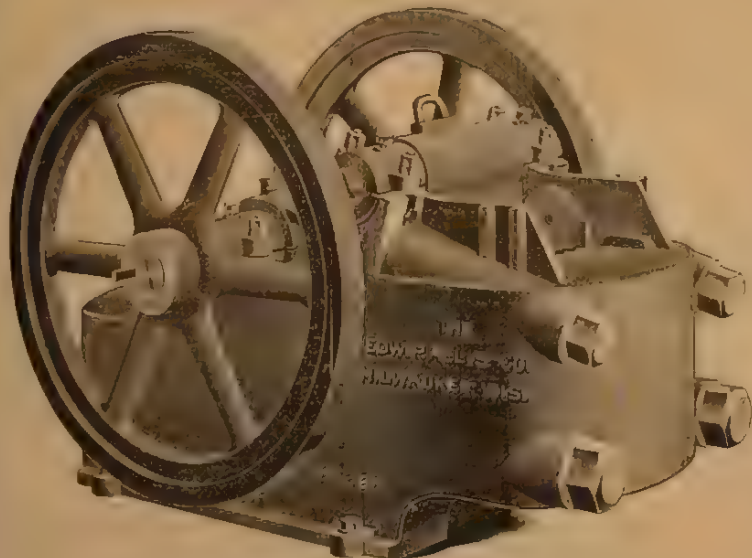
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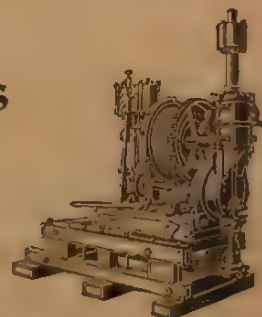
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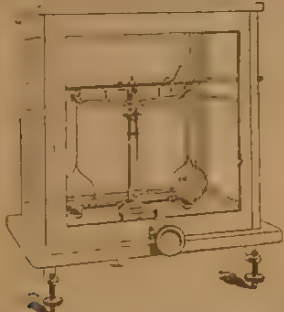
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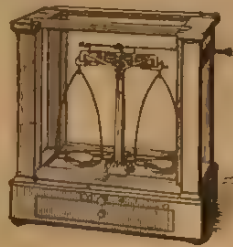
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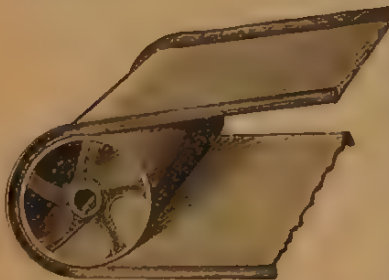
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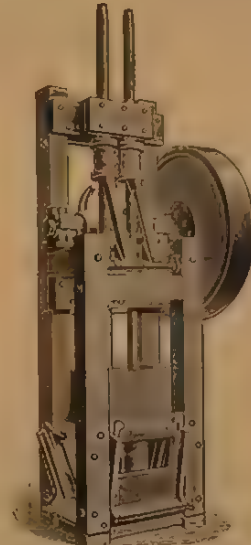
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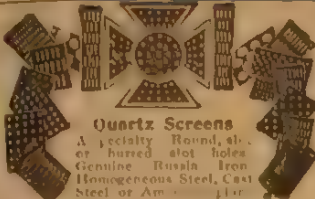
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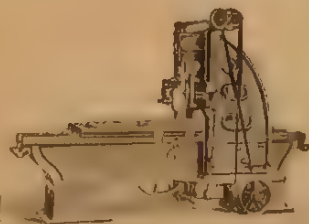
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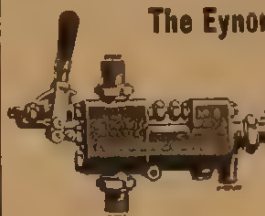
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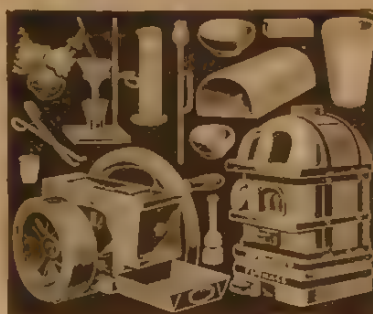
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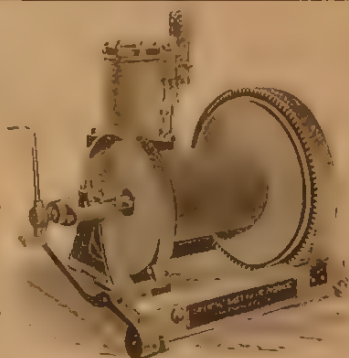
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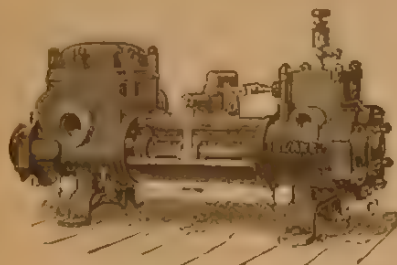
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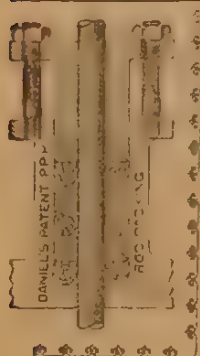
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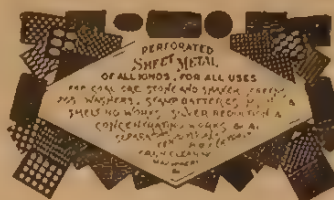
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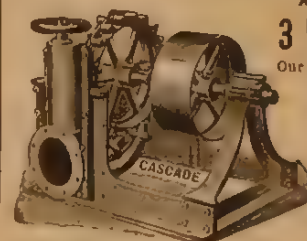
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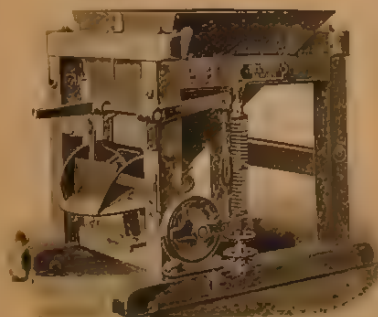
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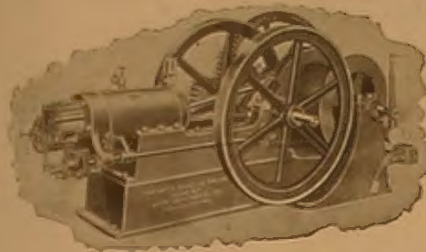
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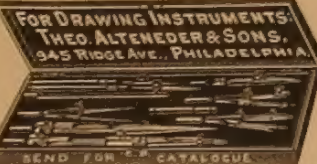
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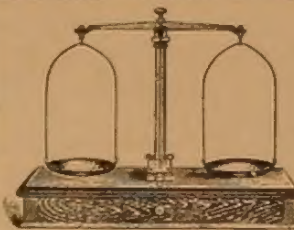
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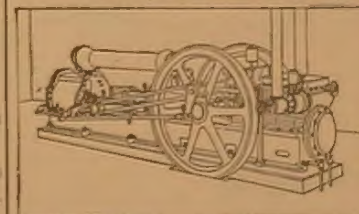
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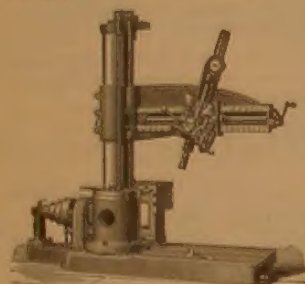
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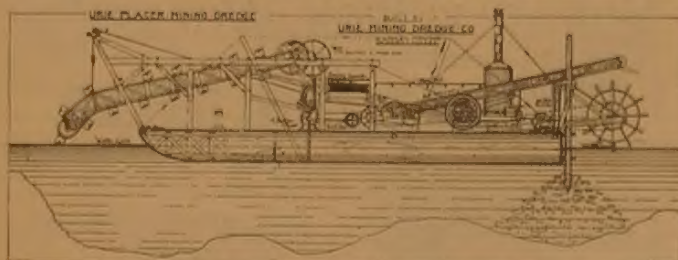
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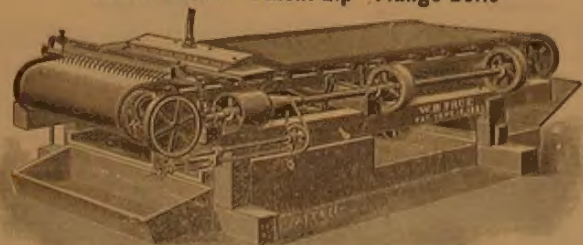
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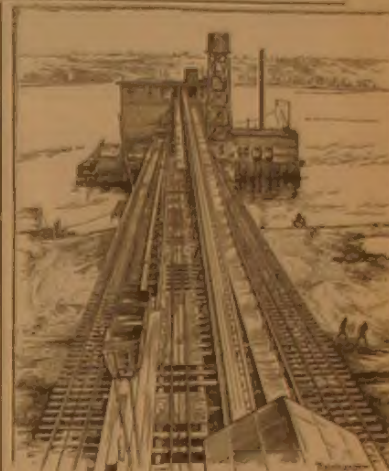
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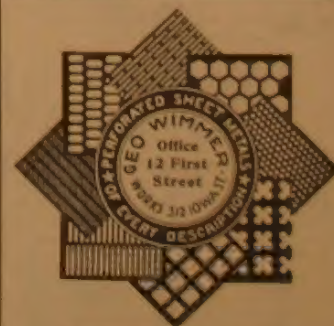
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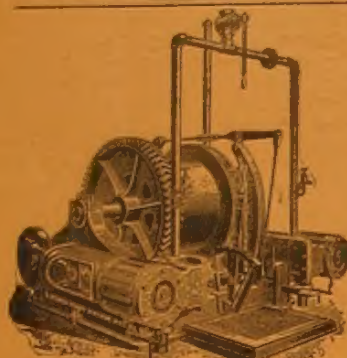
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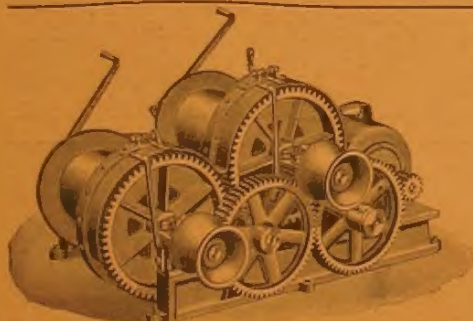
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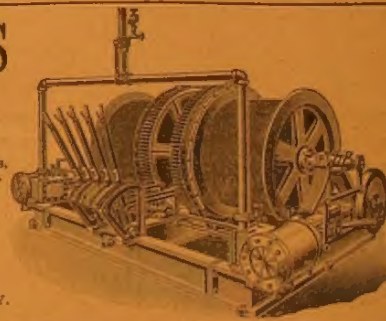
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